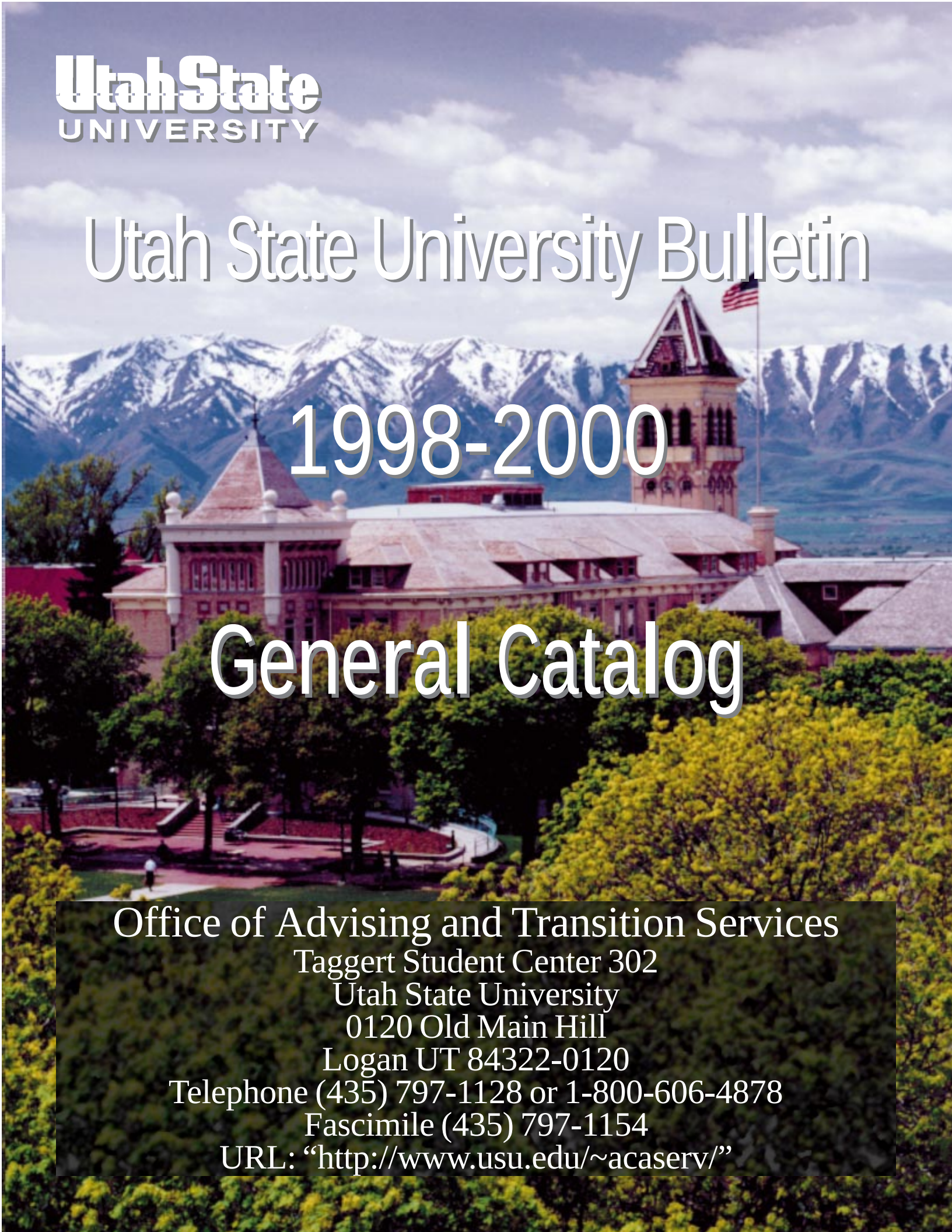
1998

General Catalog 1998-2000

Utah State University



Utah State University

Utah State University Bulletin

1998-2000

General Catalog

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Taggert Student Center 302
Utah State University
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URL: “http://www.usu.edu/~acaserv/”

Catalog Information

Catalog information and University requirements may change at any time. USU is not bound by requirements or regulations listed in this catalog. Information may change before a new catalog is issued, and students must adhere to changes. It is the student's obligation to ascertain current rules, regulations, fees, and requirements. This catalog is also available on the Web (http://www.usu.edu). Changes in catalog information will be entered on the Web. For 1999-2000, Web-based catalog information will be official.

Purchase of Catalog

To obtain a printed copy of this catalog, phone Express-a-book at one of the following numbers: 1-(800) 662-3950, (435) 797-0813, or FAX (435) 797-3793.

Course Descriptions

Course descriptions in this catalog are an overview and generally reflect what will be taught, but students should not rely on them as a guarantee of what they will be taught in a given semester.

Assumption of Risk

Some classes, programs, and extracurricular activities within the University involve some risk and some may also involve travel. The University provides these programs on a voluntary basis, and students ought not participate in them if they do not care to assume the risks. Students ought to inquire as to possible risks a program may generate, and if they are not willing to assume the risks, they should not select that program. By voluntarily participating in these types of classes, programs, and extracurricular activities the student agrees not to hold USU or its staff liable.

Equal Opportunity/Affirmative Action

Utah State University is committed to providing equal educational and employment opportunity regardless of race, sex, color, religion, national origin, marital or parental status, physical or mental disability, veteran status, or age. USU also has a policy prohibiting sexual harassment of students, faculty, and staff. Equal opportunity applies to all aspects of employment: recruiting, hiring, promoting, training, benefits, and salary. Equal educational opportunities include admission, access to course offerings, financial assistance, housing, and extracurricular activities.

Privacy Rights

In compliance with the Family Educational Rights and Privacy Act of 1974, Utah State University has developed policy guidelines which (1) provide that eligible students will have access to inspect and review their educational records, and (2) protect the rights of a student to privacy by limiting access to the educational record without express written consent. **Note:** There are restricted situations in this act where access to an educational record **does not** require the express written consent of the student.

University Smoking Policy

Utah State University conforms to the provisions of the 1992 Utah House Bill No. 197—Clean Air in Government Buildings, Utah Code Section 76-10-106. The provisions of this bill include the following: (a) A person may not smoke in a building, or portion of a building, that is owned, leased, or occupied by the state or any state agency; (b) Designated smoking areas in buildings are prohibited under this subsection; and (c) This subsection takes precedence over any conflicting provision of this section.

It is the responsibility of all University staff and students to adhere to this policy and to appropriately inform campus visitors of its provisions. Deans, department heads, and other supervisory personnel are responsible for the enforcement of the policy.

Materials for Persons with Disabilities

This catalog is available in large print, audio, and braille format upon request to the USU Disability Resource Center.

UTAH STATE UNIVERSITY BULLETIN
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Utah State University

The academic advantages of a large university together with the friendliness of a small college are offered at Utah State University. With a student body of more than 20,000, USU recognizes that the needs of the individual are of major importance, and many programs have been established to give the student the optimum of individual attention.

With 44 departments in eight academic colleges, a School of Graduate Studies, University Extension, and several research programs, Utah State University offers an excellent opportunity for students to study a wide range of subjects.

USU was founded in 1888 as part of the public educational system of Utah and operates under the constitution and laws of the state. It belongs to the family of institutions known as land-grant universities, which had their origin in 1862. The institution was originally called the Agricultural College of Utah, later becoming Utah State Agricultural College. The state legislature designated the name change to Utah State University in 1957.

A sixteen-member State Board of Regents governs the Utah state system of higher education. This board has the responsibility for state-wide master planning for higher education, assignment of roles to the several institutions in the state system, and control of operating and capital budgets for the institutions. USU has a ten-member Board of Trustees which is responsible for implementing the assigned roles, including the appointment of personnel and the enactment of rules and governing regulations.

USU is governed by the State Board of Regents and accredited by Northwest Association of Schools and Colleges, National Council for Accreditation of Teacher Education, American Psychological Association, American Association of Family and Consumer Sciences, the American Assembly of Collegiate Schools of Business, Utah State Board of Education—Teacher Education Program, Council on Rehabilitation Education, Accrediting Board of Engineering and Technology, American Society of Landscape Architects, Commission on Accreditation—Council on Social Work Education, American Chemical Society, Society of American Foresters, National League for Nursing, American Boards of Examiners in Speech Pathology and Audiology, American Dietetic Association, Foundation for Interior Design, Education, and Research, National Association of Schools of Music, Utah State Board of Vocational Education, and the Society for Range Management. USU is a land-grant and a Carnegie Foundation “Research University I” institution. Credit earned at USU is fully transferable to other universities and colleges in the United States of America.

Utah State University Mission Statement

Utah State University integrates teaching, research, extension, and service to meet its unique role as Utah's land-grant university. Students are the focus of the University as they seek intellectual, personal, and cultural development.

The mission of Utah State University is to provide high quality undergraduate and graduate instruction, excellent general education, and specialized academic and professional degree programs. USU is committed to preparing students to serve the people of Utah, the nation, and the world.

USU provides nationally and internationally acclaimed programs of basic and applied research. USU engages in research to further the quest for knowledge and to help society meet its scientific, technological, environmental, economic, and social challenges.

Outreach to Utah's citizens through extension and service programs is central to the University's mission. The University's outreach programs provide to individuals, communities, institutions, and industries throughout the state, services that help improve technology, the environment, and quality of life.

In all its endeavors, the University is committed to developing responsible citizens through freedom of inquiry and expression, and through its best efforts in teaching, research, creative arts, extension and service, and encouraging cultural diversity.

Calendar

1998-1999

Fall Semester 1998

August 31	Classes begin
September 7	Holiday (Labor Day)
November 25-27	Thanksgiving break
December 7-11	No-test week
December 11	Last day of classes
December 14-17	Final examinations

Spring Semester 1999

January 11	Classes begin
January 18	Holiday (Human Rights Day)
February 15	Holiday (Presidents' Day)
March 15-19	Spring Break
April 26-30	No-test week
April 30	Last day of classes
May 3-7	Final examinations
May 7, 8	Graduation

Summer Session 1999

May 10-June 4	Early Session
May 10-August 6	12-week Session
June 7-11	Workshop Break Week
May 31, July 5, July 23	Holidays
August 6	Test Day
June 7-11	First Workshop Week
June 14-August 6	8-week Session
June 14-July 9	First 4-week Session
July 5	Holiday (Independence Day)
July 12-August 6	Second 4-week Session
July 23	Holiday (Pioneer Day)
August 9-13	Second Workshop Week

1999-2000

Fall Semester 1999

August 30	Classes begin
September 6	Holiday (Labor Day)
November 25, 26	Thanksgiving break
December 6-10	No-test week
December 10	Last day of classes
December 13-17	Final examinations

Spring Semester 2000

January 10	Classes begin
January 17	Holiday (Human Rights Day)
February 14	Holiday (Presidents' Day)
March 13-17	Spring Break
April 24-28	No-test week
April 28	Last day of classes
May 1-5	Final examinations
May 5, 6	Graduation

Summer Session 2000

May 8-June 2	Early Session
May 8-August 4	12-week Session
June 5-9	Workshop Break Week
May 29, July 4, July 24	Holidays
August 4	Test Day
June 5-9	First Workshop Week
June 12-August 4	8-week Session
June 12-July 7	First 4-week Session
July 4	Holiday (Independence Day)
July 10-August 4	Second 4-week Session
July 24	Holiday (Pioneer Day)
August 7-11	Second Workshop Week

For calendar items relating to graduate students *only*, see the *Graduate Calendar* on pages 56-57.

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Colleges

Agriculture; Rodney J. Brown, Dean; Agricultural Science 223; UMC 4800; 797-2215
Business; David B. Stephens, Dean; Business 212/202; UMC 3500; 797-2272
Education; Gerard R. Giordano, Dean; Education 109; UMC 2800; 797-1437
Engineering; A. Bruce Bishop, Dean; Engineering Class 110; UMC 4100; 797-2775
Family Life; Bonita W. Wyse, Dean; Family Life 203B; UMC 2900; 797-1536
Humanities, Arts and Social Sciences; Stan L. Albrecht, Dean; Main 338; UMC 0700; 797-1195
Natural Resources; F. E. "Fee" Busby, Dean; Natural Resources 108; UMC 5200; 797-2445
Science; James A. MacMahon, Dean; Science Engineering Research 101; UMC 4400; 797-2478

School of Graduate Studies; James P. Shaver, Dean; Main 164; UMC 0900; 797-1191
Information and Learning Resources; Byron R. Burnham, Interim Dean; Merrill Library 450; UMC 3000; 797-1637
Continuing Education; Robert L. Gilliland, Dean; Eccles Conference Center 101; UMC 5000; 797-2134

Instructional Units and Programs

Accountancy, School of; Clifford R. Skousen, Head; Business 511; UMC 3540; 797-2330
Aerospace Studies; Lt. Colonel Johnny Hays, Head; Military Science 107; UMC 9590; 797-8723
Agricultural Systems Technology and Education; Gary S. Straquadine, Head; Agricultural Systems Technology and Education 101; UMC 2300; 797-2230
Animal, Dairy and Veterinary Sciences; Robert C. Lamb, Head; Agricultural Science 232; UMC 4815; 797-2162
Art; Craig J. Law, Head; Fine Arts Visual 120; UMC 4000; 797-3460
Biological and Irrigation Engineering; Wynn R. Walker, Head; Engineering Class 216; UMC 4105; 797-2785
Biology; Edmund D. Brodie, Jr., Head; Biology-Natural Resources 123; UMC 5305; 797-2485
Business Administration, Department of; Philip R. Swensen, Head; Business 811; UMC 3510; 797-2362
Business Administration, Master of; C. R. Michael Parent, Associate Dean for Business Graduate Studies; Business 302; UMC 3535; 797-2360
Business Information Systems and Education; Lloyd W. Bartholome, Head; Business 711; UMC 3515; 797-2342
Chemistry and Biochemistry; Vernon D. Parker, Head; Maeser Laboratory 106; UMC 0300; 797-1619
Civil and Environmental Engineering; Loren R. Anderson, Head; Engineering Laboratory 211; UMC 4110; 797-2932
Communication; Edward C. Pease, Head; Animal Science 310; UMC 4605; 797-3292
Communicative Disorders and Deaf Education; Thomas S. Johnson, Head; Communicative Disorders 102C; UMC 1000; 797-1375
Computer Science; Donald H. Cooley, Head; Main 414; UMC 4205; 797-2451
Ecology, Interdepartmental Program in; Martyn M. Caldwell, Acting Director; Natural Resources 314; UMC 5205; 797-2555
Economics; Keith R. Criddle, Head; Business 615; UMC 3530; 797-2310
Education, Interdepartmental Doctoral Program in; Gerard R. Giordano, Chair; Education 109; UMC 2800, 797-1437
Electrical and Computer Engineering; Richard W. Harris, Head; Engineering Laboratory 149; UMC 4120; 797-2840
Elementary Education; Jay A. Monson, Head; Education 385A; UMC 2805; 797-0385
English; Jeffrey Smitten, Head; Ray B. West 201; UMC 3200; 797-2733
Family and Human Development; Brent C. Miller, Head; Family Life 211; UMC 2905; 797-1501
Fisheries and Wildlife; Raymond D. Dueser, Head; Natural Resources 206; UMC 5210; 797-2459
Forest Resources; Terry L. Sharik, Head; Natural Resources 208; UMC 5215; 797-3219
Geography and Earth Resources; Ted J. Alsop, Interim Head; Natural Resources 201; UMC 5240; 797-1790
Geology; Donald W. Fiesinger, Head; Geology 205; UMC 4505; 797-1273
Health, Physical Education and Recreation; Arthur R. Jones, Head; Physical Education 122; UMC 7000; 797-1495
History; Norman L. Jones, Head; Main 323; UMC 0710; 797-1290
Honors Program; David F. Lancy, Director; Merrill Library 374; UMC 3015; 797-2715
Human Environments; Joan R. McFadden, Head; Family Life 303; UMC 2910; 797-1558
Industrial Technology and Education; Maurice G. Thomas, Head; Industrial Science 112E; UMC 6000; 797-1795
Instructional Technology; Don C. Smellie, Head; Education 215; UMC 2830; 797-2694
Intensive English Language Institute; Franklin I. Bacheller, Director; Main 202; UMC 0715; 797-2081
Landscape Architecture and Environmental Planning; Richard E. Toth, Head; Fine Arts Visual 230; UMC 4005; 797-0500
Languages and Philosophy; Diane P. Michelfelder, Head; Main 204; UMC 0720; 797-1209
Liberal Arts and Sciences Program; Ann Leffler, Director; Main 338E; 797-1195
Management and Human Resources; Gary R. Oddou, Head; Business 411; UMC 3555; 797-2787
Mathematics and Statistics; E. Robert Heal, Interim Head; Lund Hall 211; UMC 3900; 797-0244

Mechanical and Aerospace Engineering; J. Clair Batty, Head; Engineering Laboratory 176; UMC 4130; 797-2867
Molecular Biology, Interdepartmental Specialization in; Joseph K.-K. Li, Director; Veterinary Science Building 323; UMC 5305; 797-1914
Music; Bruce M. Saperston, Head; Fine Arts 107; UMC 4015; 797-3000
Natural Resource and Environmental Policy, Interdisciplinary Certificate Program in; Joanna Endter-Wada, Director; Natural Resources 355B; UMC 5215; 797-2487
Nursing Program, Cooperative; Operated under College of Science in cooperation with Weber State University; Pamela E. Hugie, Coordinator; Lundberg Building 201; UMC 2600; 797-1515
Nutrition and Food Sciences; Ann W. Sorenson, Head; Nutrition and Food Sciences 213; UMC 8700; 797-2126
Physics; W. John Raitt, Head; Science Engineering Research 250A; UMC 4415; 797-2857
Plants, Soils, and Biometeorology; V. Philip Rasmussen, Head; Agricultural Science 322-C; UMC 4820; 797-2233
Political Science; Randy T. Simmons, Head; Main 320A; UMC 0725; 797-1306
Psychology; David M. Stein, Head; Education 487; UMC 2810; 797-1460
Rangeland Resources; John C. Malechek, Head; Natural Resources 210; UMC 5230; 797-2471
Secondary Education; William J. Strong, Head; Education 330; UMC 2815; 797-2222
Social Sciences, Interdepartmental Program in; Gerard R. Giordano, Dean; Main 338; UMC 0700; 797-1195
Sociology, Social Work and Anthropology; Gary H. Kiger, Head; Main 224; UMC 0730; 797-1230
Special Education and Rehabilitation; Charles L. Salzberg, Head; Education 313A; UMC 2865; 797-3243
Theatre Arts; Colin B. Johnson, Head; Fine Arts 232; UMC 4025; 797-3046
Toxicology, Interdepartmental Program in; Roger A. Coulombe, Jr., Director; Animal Science 213; UMC 4620; 797-1600
Watershed Science (College of Natural Resources Interdepartmental Program); James P. Dobrowolski, Director; Biology-Natural Resources 179; UMC 5230; 797-2547

Notes: The area code for all phone numbers listed above is 435. To dial a number with a "797" prefix from an on-campus telephone, dial "7," followed by the last four digits of the telephone number. The four-digit UMC (University Mail Code) number should precede "Old Main Hill" and should be added to the University zip code (84322) to make a nine-digit zip code on mail coming from off-campus. (Example: Political Science Department, Utah State University, 0725 Old Main Hill, Logan UT 84322-0725.)

Degrees Offered at Utah State University

College of Agriculture

Agricultural Systems Technology and Education
- Agricultural Education—BS, BA
- Agricultural Machinery Technology—One-year Certificate, AAS
- Agricultural Systems Technology—BS, BA, MS, MA

Animal, Dairy and Veterinary Sciences
- Animal Science—BS, BA, MS, MA, PhD
- Bioveterinary Science—BS, BA, MS, MA
- Dairy Science—BS, BA, MS, MA
- VoTech Dairy Herdsman—One-year Certificate

Economics
- Agribusiness Management—BS
- Agricultural Economics—BS, MS, MA
- Community Economic Development—MCED
- Economics—BS, BA, MS, MA, PhD
- International Agribusiness—BA

Nutrition and Food Sciences
- Nutrition and Food Sciences—BS, BA, MS, MA, PhD

Plants, Soils, and Biometeorology
- Biometeorology—MS, MA, PhD
- Crop Science—BS, BA
- Environmental Soil/Water Science—BS, BA
- Horticulture—BS, BA
- Ornamental Horticulture—One-year Certificate, AAS
- Physical Ecology—MS, PhD
- Plant Ecology–MS, PhD
- Plant Science—MS, MA, PhD
- Soil Science—MS, MA, PhD

Interdepartmental Program
- Toxicology—MS, PhD

College of Business

Accountancy, School of
- Accounting—BS, BA, MAcc

Business Administration
- Business Administration—BS, BA
- Finance—BS, BA
- Marketing—BS, BA
- Production Management—BS, BA

Business Information Systems and Education
- Business Education—BS, BA
- Business Information Systems—BS, BA
- Business Information Systems and Education—MS, MEd
- Marketing Education—BS, BA
- Office Systems Support—AAS
- Education—EdD*, PhD*

Economics
- Community Economic Development—MCED
- Economics—BS, BA, MS, MA, PhD
- Social Sciences—MSS*

Management and Human Resources
- Human Resource Management—BS, BA
- Management—BS, BA
- Social Sciences—MSS*

College of Business Programs
- Business—BS, BA (Dual major and 2nd BS only)
- Master of Business Administration—MBA

College of Education

Communicative Disorders and Deaf Education
- Communicative Disorders–MS, MA, MEd, EdS
- Communicative Disorders and Deaf Education—BS, BA

Elementary Education
- Early Childhood Education—BS, BA
- Elementary Education—BS, BA, MS, MA, MEd
- Education—EdD*, PhD*

Health, Physical Education and Recreation
- Health Education Specialist—BS
- Health, Physical Education and Recreation—MS, MEd
- Parks and Recreation—BS
- Physical Education—BS

Instructional Technology
- Instructional Technology—MEd, MS, EdS, PhD

Psychology
- Psychology—BS, BA, MS, MA, PhD

Secondary Education
- Secondary Education—BS, BA, MS, MA, MEd
- Education—EdD*, PhD*

Special Education and Rehabilitation
- Special Education—BS, BA, MS, MEd, EdS, PhD
- Education—EdD*

Interdepartmental Doctorate in Education
- Education—EdD, PhD

College of Engineering

Biological and Irrigation Engineering
- Biological Engineering–BS
- Biological and Agricultural Engineering—MS, PhD
- Irrigation Engineering—MS, PhD

Civil and Environmental Engineering
- Civil and Environmental Engineering—CE, MS, ME, PhD
- Civil Engineering—BS
- Environmental Engineering—BS

Electrical and Computer Engineering
- Computer Engineering—BS
- Electrical Engineering—BS, MS, ME, MES, EE, PhD

Industrial Technology and Education
- Aeronautics—AAS
- Drafting—AAS
- Industrial Teacher Education—BS
- Industrial Technology—MS
- Industrial Technology (AeroTechnology)—BS
- Industrial Technology (Electronics/Computer)—BS

Industrial Technology (Flight)—BS
Industrial Technology (Welding Engineering Technology)—BS

Mechanical and Aerospace Engineering
Aerospace Engineering—BS
Mechanical Engineering—BS, MS, ME, PhD

College of Family Life

Family and Human Development
Early Childhood Education—BS, BA
Family and Human Development—BS, BA, MS
Family Life—PhD*

Human Environments
Apparel Merchandising—BS, BA
Family and Consumer Sciences—BS, BA
Family and Consumer Sciences Education—BS, BA
Human Environments—MS
Interior Design—BS, BA
Family Life—PhD*

Nutrition and Food Sciences
Nutrition and Food Sciences—BS, BA, MS, MA, PhD

Interdepartmental Program
Family Life—PhD

College of Humanities, Arts and Social Sciences

Art
Art—BA, BS, BFA, MA, MFA

Communication
Communication—MS, MA
Journalism—BS, BA

English
American Studies—BS, BA, MS, MA
English—BS, BA, MS, MA

History
History—BS, BA, MS, MA
Social Sciences—MSS*

Landscape Architecture and Environmental Planning
Landscape Architecture—BLA, MLA
Town and Regional Planning—MS

Languages and Philosophy
French—BA
German—BA
Philosophy—BS, BA
Spanish—BA
Second Language Teaching–MSLT

Music
Music—BA, BM
Music Therapy—BS, BA

Political Science
Political Science—BS, BA, MS, MA
Prelaw—BS, BA

Sociology, Social Work and Anthropology
Anthropology—BS, BA
Social Work—BS, BA
Social Sciences—MSS*
Sociology—BS, BA, MS, MA, PhD

Theatre Arts
Theatre Arts—BA, BFA, MA, MFA

Interdisciplinary HASS Program
Asian Studies—BA

Interdisciplinary HASS and Science Program
Liberal Arts and Sciences—BA

College of Natural Resources

Fisheries and Wildlife
Aquatic Ecology—MS, PhD
Fisheries and Wildlife—BS, MS, PhD
Fisheries and Wildlife Ecology—MS, PhD

Forest Resources
Environmental Studies—BS
Forest Ecology—MS, PhD
Forest Management—MF
Forestry—BS, MS, MF, PhD
Recreation Resource Management—BS, MS, PhD

Geography and Earth Resources
Geography—BS, BA, MS, MA

Rangeland Resources
Range Ecology—MS, PhD
Range Science—BS, MS, PhD

Interdisciplinary Natural Resources Programs
Natural Resources—MNR
Watershed Science—BS, MS, PhD

College of Science

Biology
Biology—BS, BA, MS, PhD
Biology Ecology—MS, PhD
Public Health—BS
Composite Teaching—Biological Science—BS, BA

Chemistry and Biochemistry
Biochemistry—MS, PhD
Chemistry—BS, BA, MS, PhD
Chemistry Teaching—BS, BA
Composite Teaching—Physical Science (Chem)—BS, BA

Computer Science
Computer Science—BS, BA, MS

Geology
Geology—BS, BA, MS
Geology Ecology—MS
Composite Teaching—Earth Science—BS, BA

Mathematics and Statistics
Mathematics—BS, BA, MS, MMath
Mathematics Education—BS, BA
Mathematical Sciences—PhD
Statistics—BS, BA, MS
Composite Teaching—Math/CS/Stat—BS, BA

Physics
Physics—BS, BA, MS, PhD
Physics Teaching—BS, BA
Composite Teaching—Physical Science (Physics)—BS, BA

Interdepartmental Program
Toxicology—MS, PhD

Interdisciplinary HASS and Science Program
Liberal Arts and Sciences—BA

Interdisciplinary University Degrees

Interdisciplinary Studies–BS, BA
International Studies–BA

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*Department participates in interdepartmental degree program.

Course Numbering System

USU maintains a semester system—three semesters or periods of classwork: fall, spring, and summer. Fall and spring semester are each of 15 weeks duration. Summer semester is 14 weeks with one four-week early session, one 12-week session, two workshop weeks, one eight-week session, and two four-week sessions.

Credit Enrollment. The semester credit hour is the unit upon which credit is computed. Normally, the credit hour standard is based upon 150 minutes of lecture per week, for the duration of one semester, for a three-credit class. For more specific information, refer to the current *Schedule of Classes*. To obtain credit, a student must be properly registered and pay fees for the course.

Course Numbering. Each course listed in the catalog has a number, given immediately before the name of the course. For example in the English Department there appears:

1120. Elements of Grammar.

This means the course, Elements of Grammar, is English 1120. The numbers are useful for reference and records.

Course Numbering Code. A standard code employed by all institutions in the State System of Higher Education was adopted by USU in 1970, changing all previously used numbers. Upon conversion to semesters, four-digit course numbers *replaced* the three-digit numbers formerly used under the quarter system. The first three digits of a USU semester course number are often, but not always, the same as (or similar to) the course number used for that course under quarters. The last digit of a USU semester course number is always a "0." The semester numbering system is as follows:

0010-0990	Remedial courses; will not satisfy baccalaureate requirements; nontransferable; not calculated in GPA.
1000-2790	Lower division (freshman and sophomore courses)
2800-2990	Lower division independent study designation (directed reading, individual projects, etc.)
3000-4790	Upper division (junior and senior courses)
4800-4990	Upper division independent study designations (directed reading, individual projects, festival, institutes, workshops, etc.)
5000-5990	Advanced upper division (may be used for a graduate degree with approval of the student's supervisory committee)
6000-7990	Graduate courses (students without baccalaureate degrees must obtain special permission to enroll)
5900-5990	Independent study designations (directed reading,
6900-6990	individual projects, theses, dissertations, etc.)
7900-7990	
6800-6890	Graduate seminars (includes methodology and
7800-7890	research seminars)

"H" following regular course designation indicates Honors Program courses.

A freshman or sophomore may take any lower-division course. If there is a prerequisite for a particular course, it will be so stated in the course description.

A junior or senior may take any lower- or upper-division course. Any prerequisites to a course will be identified in the course description. Seniors may take graduate courses only upon written consent from the instructor. The use of undergraduate coursework for a graduate degree at USU is regulated by the School of Graduate Studies. See *Split Form Policy* (p. 62) and *Course-Level Numbering and Acceptability* (p. 62).

A graduate student may take any course, but only graduate courses and individually approved undergraduate courses may be used for a graduate degree.

At the end of each course description are listed the number of credits given for the course and the semester(s) it will likely be taught. The credits and the semester(s) it will be taught are indicated in abbreviated form in parentheses. For example: (3F) indicates that the course offers three credits and will likely be taught fall semester. The designation (4F,Sp,Su) indicates that the course offers 4 credits and will likely be taught all three semesters: fall, spring, and summer. It does not mean that the student has to take the class all three semesters, but rather that he or she has a choice of any semester. In some cases, such as (2F,Sp), even though more than one semester is indicated, the course will not be given each semester, but only one of these semesters, the exact one yet to be decided.

For more definite up-to-date information, please refer to the University Schedule of Classes published prior to the beginning of each semester. All catalog listings are subject to change. The schedule will also update policies and practices of the University as changes occur. Catalog updates will also appear on the USU web site (http://www.usu.edu).

Occasionally two or more closely related courses will be listed under one entry, such as Mathematics **6110, 6120. Differential Geometry.** The credit entry will read: (3F) (3Sp). That means that each of the two courses offers 3 credits.

In some classes the amount of credit for which students register can be individually arranged. One student may take 2 credits, another student 3 credits, etc. Academic credit is identified in parentheses at the end of the course description, e.g. (1-3).

Preceding the number of some courses in this catalog will be either a single asterisk (*) or a double asterisk (**). Such courses are taught on alternate years. **Check the *Schedule of Classes* or consult the course instructor or department head.**

Course Prefixes

Acct—Accounting
ADVS—Animal, Dairy and Veterinary Sciences
Anth—Anthropology *(Sociology, Social Work and Anthropology Department)*
Art—Art
AS—Aerospace Studies
ASTE—Agricultural Systems Technology and Education
BA—Business Administration
BAI—Breadth American Institutions
BCA—Breadth Creative Arts
BHU—Breadth Humanities
BIE—Biological and Irrigation Engineering
Biol—Biology
BIS—Business Information Systems and Education
BLS—Breadth Life Sciences
Bmet—Biometeorology *(Plants, Soils, and Biometeorology Department)*
BPS—Breadth Physical Sciences
BSS—Breadth Social Sciences
CEE—Civil and Environmental Engineering
Chem—Chemistry and Biochemistry
Chin—Chinese
CI—Communications Intensive
CL—Communications Literacy
Clas—Classics *(History Department)*
ComD—Communicative Disorders and Deaf Education
Comm—Communication *(Journalism)*
CS—Computer Science
DE—Dance Education *(Health, Physical Education and Recreation Department)*
DHA—Depth Humanities and Creative Arts
DSC—Depth Sciences
DSS—Depth Social Sciences
ECE—Electrical and Computer Engineering
Econ—Economics
Educ—College of Education
ElEd—Elementary Education
Engl—English
Engr—General Engineering
FHD—Family and Human Development
FL—College of Family Life
FR—Forest Resources
Fren—French
FW—Fisheries and Wildlife
Geog—Geography *(Geography and Earth Resources Department)*
Geol—Geology
Germ—German
Grk—Greek *(History Department)*
HASS—College of Humanities, Arts and Social Sciences
HEnv—Human Environments
HEP—Health Education—Professional *(Health, Physical Education and Recreation Department)*
Hist—History
Honr—Honors Courses
IELI—Intensive English Language Institute
InsT—Instructional Technology
Ital—Italian
ITE—Industrial Technology and Education
Japn—Japanese
Kor—Korean
LAEP—Landscape Architecture and Environmental Planning
Lang—Languages (General)
LAS—Liberal Arts and Sciences
Latn—Latin *(History Department)*
Ling—Linguistics
MAE—Mechanical and Aerospace Engineering
Math—Mathematics *(Mathematics and Statistics Department)*
MHR—Management and Human Resources
Musc—Music
NFS—Nutrition and Food Sciences
NR—Natural Resources
PE—Physical Education *(Health, Physical Education and Recreation Department)*
PEP—Physical Education—Professional *(Health, Physical Education and Recreation Department)*
Phil—Philosophy *(Languages and Philosophy Department)*
Phyx—Physics
PlSc—Plant Science *(Plants, Soils, and Biometeorology Department)*
PolS—Political Science
Port—Portuguese
PRP—Parks and Recreation—Professional *(Health, Physical Education and Recreation Department)*
PSB—Plants, Soils, and Biometeorology
Psy—Psychology
PubH—Public Health *(Biology Department)*
QI—Quantitative Intensive
QL—Quantitative Literacy
Reh—Rehabilitation Counseling *(Special Education and Rehabilitation Department)*
RLR—Rangeland Resources
RR—Recreation Resources *(Forest Resources Department)*
Russ—Russian
ScEd—Secondary Education
Sci—College of Science
Soc—Sociology *(Sociology, Social Work and Anthropology Department)*
Span—Spanish
SpEd—Special Education *(Special Education and Rehabilitation Department)*
Soil—Soil Science *(Plants, Soils, and Biometeorology Department)*
Spch—Speech *(Languages and Philosophy Department)*
Stat—Statistics *(Mathematics and Statistics Department)*
SW—Social Work *(Sociology, Social Work and Anthropology Department)*
Thea—Theatre Arts
USU–University Studies *(General Education)*
WS—Watershed Science

Tuition, Fees, and Refunds

Registration for a semester is not complete until all fees have been paid in full.

Tuition and Fees per Semester[1]

UNDERGRADUATE STUDENTS

Credits	Utah Resident	Nonresident[2]	International Students[3]
1	$237.06	$636.12	$681.12
2	299.44	855.10	900.10
3	366.32	1078.58	1123.58
4	442.20	1311.06	1356.06
5	509.08	1534.54	1579.54
6	574.46	1756.52	1801.52
7	719.84	2058.50	2103.50
8	801.72	2296.98	2341.98
9	868.60	2520.46	2565.46
10	935.48	2743.94	2788.94
11	997.86	2962.92	3007.92
12	1060.24	3181.90	3226.90
13	1122.62	3400.88	3445.88
14	1122.62	3400.88	3445.88
15	1122.62	3400.88	3445.88
16	1122.62	3400.88	3445.88
17	1122.62	3400.88	3445.88
18	1122.62	3400.88	3445.88
19	1185.00	3619.86	3664.86
20	1247.38	3838.84	3883.84
21	1309.76	4057.82	4102.82
22	1372.14	4276.80	4321.80
23	1434.52	4495.78	4540.78
24	1496.90	4714.76	4759.76
25	1559.28	4933.74	4978.74

Note: Over 25 credits, additional tuition is $62.38 per credit hour for undergraduate residents.

Over 25 credits, additional tuition is $218.98 per credit hour for undergraduate nonresidents.

GRADUATE STUDENTS

Credits	Utah Resident	Nonresident[2]	International Students[3]
1	$252.99	$691.89	$736.89
2	321.61	932.77	977.77
3	394.73	1178.15	1223.15
4	476.85	1432.53	1477.53
5	549.97	1677.91	1722.91
6	621.59	1921.79	1966.79
7	773.21	2245.67	2290.67
8	861.33	2506.05	2551.05
9	934.45	2751.43	2796.43
10	1007.57	2996.81	3041.81
11	1076.19	3237.69	3282.69
12	1144.81	3478.57	3523.57
13	1213.43	3719.45	3764.45
14	1213.43	3719.45	3764.45
15	1213.43	3719.45	3764.45
16	$1213.43	$3719.45	$3764.45
17	1213.43	3719.45	3764.45
18	1213.43	3719.45	3764.45
19	1282.05	3960.33	4005.33
20	1350.67	4201.21	4246.21
21	1419.29	4442.09	4487.09
22	1487.91	4682.97	4727.97
23	1556.53	4923.85	4968.85
24	1625.15	5164.73	5209.73
25	1693.77	5405.61	5449.61

Note: Over 25 credits, additional tuition is $68.62 per credit hour for graduate residents.

Over 25 credits, additional tuition is $240.88 per credit hour for graduate nonresidents.

The University reserves the right to alter any tuition or fee charges without notice.

Visitor fee (audit) . . . . . same as classes with credit (except for persons 62 years of age or older who are permitted to audit free of charge after a recording fee of $10.00 per semester has been paid)

Late registration fee **$20**
(assessed beginning the first day of classes)

Continuing Graduate Advisement Courses (6990 and 7990). There is no limit on the number of times a graduate student may register for 6990 or 7990 credit. Resident tuition is charged for 6990 or 7990 credits, and out-of-state tuition is not charged.

Continuous Graduate Registration Fee $15

[1]These fees are effective Fall Semester 1998.

[2]Other U.S. citizens and immigrants

[3]Non-U.S. citizens and immigrants

Tuition Refund Policy

Refund Period	Percent of Tuition to be Refunded
Before Semester Classes Begin	100%
First 2 Days of the Semester	100%
3rd thru 5th Day of Classes	90%
Thru the 10th Day of Classes	70%
Thru the 15th Day of Classes	50%
After the 15th Day of Classes	0%

Fee Refunds. (1) Ten dollars of every registration fee and the insurance fee are nonrefundable. (2) After the $10 fee above is deducted from the registration fee, a proportionate share of all fees paid may be refunded to any student who withdraws from school before the 15th day of classes. (3) All refunds will be mailed to the student. (4) The application and evaluation fee for an undergraduate or graduate applicant is not refundable. (5)

Activity fees will be pro-rated. (6) All refunds must be applied for at the Cashiers Office. (7) Students with financial aid need approval from the Financial Aid Office in order to receive a refund. (8) Complete withdrawal must be approved by the Financial Aid Office or by the Office of Advising and Transition Services.

Delinquent Financial Accounts. Students with outstanding financial obligations may be refused all University services until such obligations are paid. Services which may be denied include the following: registration, transcripts, grades, transfer of credit, and graduation.

ID Cards. An ID card will be prepared for new freshmen and transfer students upon proof of fee payment. However, electronic validation is required *each semester* before the ID card will be acceptable for admission to student activity attractions. Upon payment of tuition and fees, students registering for 7 or more credits will automatically have their cards validated. Students registered for less than 7 credits must pay $78.50 to have their cards validated. A student who holds a validated card may purchase an additional validated card for his or her spouse for $28.00. Lost ID cards may be replaced for $5.00.

Semester Note. To ease the transition from quarters to semesters, the Semester Note gives students the option to pay most of their tuition up front, with the remainder due 60 days into the semester. The cost for the Semester Note is $22, and 65 percent of the tuition and fees is due at fee payment time. This payment option is available during the total fee payment period and will retain classes at the fee payment deadline.

Deferred Fee Note. Unlike the Semester Note, the Deferred Fee Note is not available until after the fee payment deadline. This note is due 45 days into the semester. The cost of the deferred fee note is $33, and a $115 down payment is required.

Miscellaneous Payments. If any payment made to the University is unauthorized, incomplete, or received after the due date, registration fees will be considered as **unpaid**, and the student will not be officially registered.

Personal Checks. Personal checks returned by the bank for any reason will subject the student to a service charge and, at the discretion of the Controller's Office, may result in the withholding of registration credit or immediate cancellation of the student's classes. USU reserves the right to refuse personal checks for any transaction. Check cashing privileges and use of other University services using personal checks may be suspended for any individual who has a check returned to the University.

Sponsored Payments. Students whose tuition and fees are paid by a sponsor may contact the Student Receivables Office, Main 21A, for authorization to complete registration. International students with a sponsor should contact the International Programs and Studies Office, MS 216, (435) 797-1843.

Computer and Information Literacy Examination. All students working toward a bachelor's degree must pass this examination as part of the University Studies requirements. Upon payment of a fee, students may take the exam in a USU student-access computer laboratory. For additional information about this exam, see page 53.

Special Fees. Special fees, charged in addition to tuition and registration fees, are assessed on the Registration/Billing Statement. Carefully review the University *Schedule of Classes* to determine which courses require special fees.

Tuition Surcharge for Excessive Credits. By Board of Regents policy, students are expected to complete their undergraduate degree within a reasonable margin beyond the 120 credits required for graduation. Students who accumulate 180 credits, and who have not graduated, will be assessed nonresident tuition rates beginning the next available semester. It is the goal of Utah State University to graduate students in a timely and appropriate manner. As students accumulate 160 credits, official notice will be sent to them informing them of the Surcharge Policy. Students will then be required to fill out a Graduation Application before being permitted to register for the next semester. The approved Graduation Application will specify the period in which the student may continue attendance without paying the surcharge. Students who do not follow the terms of the application and accumulate 180 credits will begin paying the tuition surcharge. **Exceptions** to the Surcharge Policy will be made by the Board of Regents for students wishing to enhance their degree with additional minors or emphases, for students having multiple majors, for reentry students with a new major, for students with degrees, and for transfer students having substantial credits which don't apply to their present program. After submitting a graduation application and obtaining approval of the college dean, a student meeting criteria for one of these exceptions may continue beyond 180 credits without paying the surcharge.

Parking Permits

Parking Permits for students. . . . . $17 per semester
$30 per year

Parking Permit for students living in dorms . . . . . $30 per year

Parking permits for students living in the Student Living Center or Aggie Village . . . . . $15 per year

Gate Card . . . . . $5 deposit

Music. Fees are charged for piano practice and private instruction. For information on amounts, contact the Music Department.

Division of General Registration Fee . . . . . $45 per semester

Health and Accident Insurance is available to all students for nominal costs at the time of registration. Additional insurance may be purchased for spouse and children. Insurance coverage is mandatory for international students. Students are encouraged to provide themselves with adequate protection in case of illness or serious injury. See University *Schedule of Classes* for premiums.

Insurance Information/International Students

All international students attending Utah State University are required to purchase one of the student health insurance plans offered at the University for themselves and accompanying dependents. Insurance coverage is required each semester.

International students are cautioned to purchase only temporary travel insurance to cover travel to the U.S.

Admission Application and Evaluation Fee (nonrefundable):

U.S. Residents (undergraduate) $35
Foreign Students (undergraduate). $35

Special Examination Fee: $10 per course plus $5 per credit hour up to a maximum of $50 including the $10 examination fee.

Late Graduation Application Fee for undergraduate candidate $10

Graduation Fee:

One-year Certificate. $10
Two-year Diploma $10
Associate of Applied Science Degree. $10

Bachelor's Degree $10
Advanced Degree $15

Cap and Gown Rentals:

Bachelor's Degrees $16
Master's Degrees $19
Doctor of Philosophy or Education $19

Teacher Placement Registration $10

Transcript of Credits. The transcript fee (per transcript) is $3 for the first transcript and $1 for each additional transcript *on the same order*. The fee is to be paid in the Office of the Registrar (Records Services), Taggart Student Center 246.

University Publications. To purchase a Utah State University *General Catalog* or Semester *Schedule of Classes*, phone Express-a-book at one of the following numbers: 1-(800) 662-3950, (435) 797-0813, or FAX (435) 797-3793.

Information on Scholarships, Fellowships, and Assistantships can be found in the *Financial Aid and Scholarship Information* section of this catalog (pages 21-38).

Housing Fees. Write for a Housing Bulletin; send request to the Office of Housing and Residential Life, Utah State University, 8600 Old Main Hill, Logan UT 84322-8600.

Estimated Cost of Education for Two Semesters (Based on 1998-99 Costs)

	Resident	**Nonresident**
Tuition and Fees[1]	$ 2,246	$ 6,802[2]
Room and Board	4,720	4,720
Books and Supplies	800	800
Personal Expenses[3]	1,620	1,620
Totals	$ 9,386	$13,942

[1]See complete schedule of tuition and fees on page 14.

[2]See tuition and fee schedule for international students, page 14.

[3]Transportation costs of approximately $1,130 (in addition to the Personal Expenses listed here) are included in the Financial Aid Office estimated costs. See page 22.

Registration

Office of the Registrar: SC 246, (435) 797-1094

All students attending classes must be registered. Students are officially registered when all tuition and fees have been paid in full. Failure to pay tuition and fees by the published fee payment deadline will result in courses being voided. Detailed registration instructions are printed in the University *Schedule of Classes*, which is published each semester.

Eligibility. Only eligible students may register for courses at the University. An eligible student is either continuing from the previous semester or has been admitted or readmitted to the University.

Registration Procedures. The University *Schedule of Classes* lists each semester's course offerings, dates, times, places, and procedures for registration and fee payment.

Late Registration. A $20 late registration fee is assessed beginning the first day of classes. Students must complete registration by the end of the third week of the semester.

Assignment of Adviser. When undergraduate students have been admitted to the University and have indicated their proposed major field of study, their names are forwarded to the dean of the college concerned. The dean will assign advisers who will assist in registration and career planning. Students may also receive assistance from their college or the Office of Advising and Transition Services.

Full-time Status. The minimum registration load for a full-time undergraduate student is 12 credits. To be eligible for student body offices, students are required to be registered for 13 or more credits. Students on scholarships must be registered for 13 or more credits. Veterans and students eligible for a veteran's educational allowance are required to be matriculated and registered for 12 or more credits to qualify for full educational benefits.

Auditing Classes. Those who wish to audit a class must register as auditors. Auditing is dependent on space, resource availability, and instructor approval. No credit will be allowed for attendance, and the regular fee will be assessed. At no future time may the student request or receive credit for the audited course by any other means than by officially registering for the course and doing the required work. Audit requests, approved by the instructor, must be submitted to the Office of the Registrar and fees paid at the Cashiers Office before class attendance is permitted. Students are not permitted to register as auditors during Early Registration.

House Bill 60 permits Utah residents 62 years of age or older to audit regular university classes offered during the day or offered through the Extension Class Division. However, space in many university classes is limited. Classes which are full at the time of an audit request are unavailable. Credit seeking, full-tuition paying students shall have first priority in the registration process. A flat fee of $10.00 per semester is charged for House Bill 60 registration.

Pass *(P), D+, D, F* Option. Students may register for a Pass *(P), D+, D, F* option. The grade of Pass *(P)* indicates academic achievement of not less than *C-*. Credits for which the Pass *(P)* grade is received *are not quality hours*, and are therefore not used in the calculation of a student's grade point average. (See *Records* section, page 18, for more information.)

Adding Courses. Courses may be added through the 15th day of classes. The instructor's signature is required beginning the sixth day of classes. Following the 15th day of classes, the student's academic dean must also approve any add request.

Dropping Courses. Students may drop courses without limit and without notation on the permanent record through the fifth day of classes or the second meeting, whichever is later. From the sixth through the 30th day of classes, students may drop, without notation on the permanent record, no more than eight courses prior to completion of the first undergraduate degree, and no more than two courses during each additional baccalaureate degree program. Beginning with the 31st day of classes, courses dropped will be entered on the student's permanent record and reflect a *W* (withdraw). Instructors are to provide students in undergraduate classes with information to assist them in assessing their current class status prior to the 30th day of classes. Students who fail to attend class the first five days of school may be dropped from that class by the instructor. (*This does not remove the responsibility of the student to drop classes which he or she does not plan to attend*). Students receiving Veterans Educational Benefits must notify the Office of Veterans Affairs of any change in their registration. Following the 30th day of classes, or when the allowed number of drops from the sixth through the 30th day has been reached, the student's instructor, academic adviser, and academic dean must approve any drop request and this may be done only upon demonstration of conditions beyond the student's control. The term “conditions beyond the student's control” includes (1) incapacitating illnesses which prevent a student from attending classes for a period of at least two weeks; (2) a death in the immediate family; (3) financial responsibilities requiring a student to alter course schedule to secure employment; (4) change in work schedule as required by employer; or (5) other emergencies of this nature. Documentation of the circumstances cited to justify dropping after the deadline is required. Under no circumstances is dropping a course after the 30th day permitted for the purpose of avoiding an unsatisfactory grade; neither shall *I* grades be given to avoid the consequences of inadequate performance. Appeal to the dean's decision may be directed to the Provost's Office. (For transition drop policy, see the current University *Schedule of Classes.*) A student may not drop all of his or her classes without an official withdrawal from the University.

Withdrawal from the University. The student must initiate an official withdrawal from the University by appearing in person or by addressing a signed request to the Office of the Registrar. No one will be permitted to withdraw from the University once final examinations have begun. The date of the official withdrawal is the date the withdrawal form or letter is received. A student who withdraws must be accepted for readmission before he or she may enroll again.

No-test Days. A five-day period designated as No-test Days precedes the four days of final examinations which are normally scheduled at the close of each academic semester. During No-test Days neither final examinations nor testing of any kind will be given in order that students may concentrate upon classwork, the completion of special assignments, writing projects, and other preparation for duly scheduled final examinations.

Proof of Identification. In order to receive University services, photo identification must be presented. Each admitted student who completes the registration process for a regular semester will be issued a student identification card. This photo identification card is valid for the duration of the student's enrollment at Utah State University. Photo IDs are issued throughout the semester in the Taggart Student Center, Room 204.

Change of Address. It is the responsibility of the student to keep the Office of the Registrar informed of address changes.

Records

Office of the Registrar: SC 246, (435) 797-1116

The custodian of educational records at Utah State University is the Office of the Registrar.

Student Classification. At the beginning of each semester, students are classified for that semester as follows:

Credit Hours Earned	Classification
0-30	Freshman
31-60	Sophomore
61-90	Junior
91 and over	Senior

Credit Enrollment. The semester credit hour is the unit upon which credit is computed. Normally, the credit hour standard is based upon 150 minutes of lecture per week, for the duration of one semester, for a three-credit class. For more specific information, refer to the current *Schedule of Classes*. To obtain credit, a student must be properly registered and pay fees for the course.

Privacy Rights

The Family Educational Rights and Privacy Act, a federal law commonly referred to as *FERPA* or the *Buckley Amendment*, (1) provides that students will have access to inspect and review their educational records and (2) protects the rights of a student to privacy by limiting access to the educational record without express written consent.

Definitions. A **student** is defined as any individual who is attending or has attended Utah State University. (Note: Certain rights are extended to the parent(s) of a dependent student, where dependency is defined by Section 152 of the Internal Revenue Code of 1954.) An **educational record** is any record (1) directly related to a student, and (2) maintained by Utah State University or by an agent of the University.

Notices. With respect to a student's educational records, FERPA affords a student the right: (1) to inspect and review the student's educational records; (2) to request the amendment of the student's educational records to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights; (3) to consent to disclosures of personally identifiable information contained in the student's educational records, except to the extent that FERPA authorizes disclosure without consent; (4) to file with the U.S. Department of Education a complaint concerning alleged failures by Utah State University to comply with the requirements of FERPA, if a complaint cannot be resolved within the University; and (5) to obtain a copy of the *Student Records Policy and Procedures for Utah State University*. (Copies are available at the Registrar's Office, Student Center 246.)

Categories of Records. There are two categories of educational records under FERPA. **Directory information** (or releasable information) is general information that may be released to anyone without the consent of the student, unless the student indicates otherwise. **Personally identifiable information** (or nonreleaseable information) includes all information not defined as directory information and may not generally be released without consent of the student.

Utah State University has designated the following as **directory information** for a student:

Releasable Information/Directory Information

Name
Local and permanent address
Electronic mail address
Telephone number
Date of birth
Residency status
Degrees and awards received
Most recent institution attended by the student
Academic level
Major field of study
Department or college
Participation in officially recognized activities/sports
Dates of attendance and graduation
Weight/height of members of athletic teams
Current semester schedule of classes

Nonreleaseable Information/All Other Information

Students may control the release of directory information by completing forms at the Registrar's Office. Students accessing educational records must provide identification. It is important to **note** that, for educational purposes, University officials have access to all student records.

Grading

For work in graded courses, *A* shall denote exceptional performance, *B* above average performance, *C* satisfactory performance, *D* poor performance, and *F* failing performance. Letter grades may be modified by plus (+) or minus (-) symbols (no *A+* or *D-*).

Quality Hours and Quality Points. A **quality hour** is defined as a credit which is used in calculating a student's grade point average (GPA). All graded credits, *except* for those in which the Pass *(P)* or Incomplete *(I)* grade is received, qualify as quality hours. **Quality points** are assigned to each letter grade earned, as noted below:

A	4.00	C+	2.33	F	0.00
A-	3.67	C	2.00		
B+	3.33	C-	1.67		
B	3.00	D+	1.33		
B-	2.67	D	1.00		

Scholastic Marks, which do not qualify for quality hours, are as follows:

I	Incomplete	P	Pass
W	Withdrawal	AU	Audit

Grade Point Average. When a student is graded, the quality points for the grade are multipled by the quality hours to derive the total quality points. The total quality points are then divided by the total quality hours to determine the GPA. GPAs are rounded to the nearest hundredth of a grade point.

Grading Options. Ordinarily a letter grade is given upon completion of a course, unless a grading option of “Audit” or “Pass/D+, D, F” is indicated at the time of registration or within prescribed deadlines.

***Pass/D+, D, F* Option.** Under this option, the grade of *P* indicates academic achievement of not less than *C*-. All students, including freshmen, may take courses on a *P/D+, D, F* basis. A minimum of 72 of the 120 credits required for the baccalaureate degree shall carry the *A, A-, B+, B, B-, C+, C, C-, D+, D* designation, unless the major department or college change this limitation. All CLEP, AP, and other special examination credits are considered *P* and are included in the total *P* grades permitted. Students exercise the *P/D+, D, F* option by submitting a request to the Office of the Registrar by the 30th class day of the semester. The *P* shall also be used to record on the student's permanent academic record all special credit in which other grades are inappropriate. Students should note that *P* grades may not be accepted by some departments for major requirements, nor by some professional or graduate schools.

Incomplete *(I)* Grade. Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but **not** due to poor performance or to retain financial aid. The term "extenuating" circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter course schedule to secure employment, (4) change in work schedule as required by employer, or (5) other emergencies deemed appropriate by the instructor. The student may petition the instructor for time beyond the end of the semester to finish the work. If the instructor agrees, two grades will be given, an "I" and a letter grade for the course computed as if the missing work were zero. Documentation of the circumstances cited to justify an incomplete grade is required.

The student is required to complete the work by the time agreed upon, or not longer than 12 months. If no change of grade is submitted by the instructor within the prescribed period, the "I" will be removed and the letter grade originally submitted with the "I" will remain as the permanent grade for the course. Arrangements to complete the missing coursework are to be made directly with the instructor awarding the "I" grade, and in accordance with departmental policy. In the absence of the original instructor, special circumstances must be handled by the department head. Documentation of required work to be completed in order to remove the "I" grade must be filed with the department office. The "I" grade should generally not require a complete repeat of the course. **A student should not reregister for the course.**

Repeating Courses. Students may repeat any course for which they have previously registered. However, the number of times a student can take the same class is limited to a total of three times (once, plus two repeats). Beyond three attempts, the student's dean must approve additional registration for the class.

The total number of repeats allowed is limited to ten. Students who exceed this limit will have an academic hold placed on their registration. Beyond ten repeats, the student's academic dean must approve additional registration for the class.

This policy does not apply to courses repeatable for credit. When a course listed in the *General Catalog* is identified with the Repeat Symbol (®), the course may be taken more than once for credit.

When a course not designated as repeatable for credit is repeated, the most recent grade and quality hours are used to recalculate the student's grade point average. The previous grade and quality hours for the same course will remain on the student's academic record, but will not be calculated in the grade point average or total quality hours completed. A course designated as repeatable (®) may be repeated to receive a higher grade, and the most recent grade and quality hours will be used in recalculating the student's grade point average. The student is responsible to declare repeated courses to the Registrar's Office by completing a Record Adjustment-Repeated Course form.

Change of Grades. The instructor of a course has the sole and final responsibility for any grade reported. Once a grade has been reported to the Office of the Registrar, it may be changed upon the signed authorization of the faculty member who issued the original grade. This applies also to the grade of Incomplete (*I*). (See USU Student Policy Handbook—Student Appeal Procedures.)

Final Grade Report. Final grades are available on the web at http://snoopy.usu.edu/ahomepg.htm. Grades are also available on the TouchLine phone system, (435) 797-8888. Official transcripts may be obtained by submitting a signed request to the Academic Records Office, *in person* at SC 246, or *by mail* to Utah State University, 1600 Old Main Hill, Logan UT 84322-1600.

Records Hold. The Office of the Registrar will place a "Records Hold" on the records of a student when an outstanding financial obligation or disciplinary action has been reported.

When a "hold" is placed on a record, the following results may occur: (1) An official and/or unofficial transcript may not be issued; (2) registration privileges may be suspended; (3) other student services may be revoked. The "hold" will remain effective until removed by the initiating office. It is the student's responsibility to clear the conditions causing the "hold."

Transfer Credit. The grades which may be transferred and recorded for transfer students shall include, but not be limited to, *A, A-, B+, B, B-, C+, C, C-, D+, D*, and *F*. Only grades earned at USU will be used in calculating USU grade point averages. Decisions concerning academic standing, once the student is admitted to USU, will be based solely on USU grades.

Remedial Courses. Courses numbered 0010-0990 will not satisfy baccalaureate requirements, are not transferable, and are not calculated in a student's grade point average.

Academic Standing. An undergraduate student is considered by the University to be in *good standing* when his or her USU cumulative GPA is 2.0 or higher. An undergraduate student whose USU cumulative GPA is *less than* a 2.0 is placed on *academic warning* or *academic probation*, based on the student's class rank and the USU cumulative GPA. A **freshman** with a USU cumulative GPA of *less than 2.0* is placed on *academic warning*. A **sophomore, junior,** or **senior** with a USU cumulative GPA of *less than 2.0* is placed on *academic probation*.

Academic Warning. An undergraduate student placed on academic warning shall be notified in writing of that action by the dean of his or her college. The notation *placed on warning* is placed on the student's transcript. The student remains on warning status as long as his or her semester GPA is 2.0 or higher until his or her cumulative GPA rises to or exceeds 2.0; the student will then be in *good standing*. A student on academic warning is placed on *academic probation* at the end of any semester in which his or her semester GPA is *less than 2.0*. Students on academic warning are encouraged to meet with their academic adviser.

Academic Probation. An undergraduate student placed on academic probation shall be notified in writing of that action by the dean of his or her college. The notation *placed on probation* is placed on the student's transcript. The student is required to meet with his or her academic adviser before the end of the fifth week and to sign a statement acknowledging the terms of the probation. Signed statements shall be maintained in the academic dean's

office. The student remains on probation status as long as his or her semester GPA is 2.0 or higher until his or her cumulative GPA rises to or exceeds 2.0; the student will then be in *good standing*. A student on academic probation is placed on *suspension* at the end of any semester in which his or her semester GPA is *less than 2.0.*

Academic Suspension. An undergraduate student placed on academic suspension shall be notified in writing of that action by the Associate Vice President for Student Services. The notation *academic suspension* is placed on the student's transcript. Any questions the student may have regarding his or her suspension can be directed to the Office of Academic Services, Division of Student Services, (435) 797-3373.

Low-Scholarship Notification for Graduate Students. The dean of the School of Graduate Studies will notify students whose GPA is below 3.0 any semester. If the GPA falls below 3.0 for two consecutive semesters, the student may be placed on probationary status and his or her graduate program may be terminated. For further information, see *Low-Scholarship Notification* (page 63).

Academic Renewal

Under certain circumstances, undergraduate students who have been admitted to Utah State University after an interruption in their collegiate education of five or more years may petition to have certain credits removed from the calculation of GPA needed for credit. The renewal procedure allows the student's academic records to be reviewed for the purpose of eliminating from grade point average computation any or all grades of *D+* or below that were entered on the academic transcript prior to admission. Petition forms are available in the Office of Enrollment Services. A $25 processing fee will be assessed.

Guidelines:

1. Academic renewal *does not* apply to graduate students nor to students pursuing a second undergraduate degree.

2. Academic renewal may be applied *only once* and is *irreversible*.

3. An absence of *five or more years* must have elapsed between admission and the last enrollment at an institution of higher education. (**Note:** Students must be currently enrolled to apply for academic renewal.)

4. After admission, but before application for renewal, the student must have completed at least one of the following at Utah State University: (a) 10 semester credits with at least a 3.00 GPA; (b) 20 semester credits with at least a 2.75 GPA; (c) 30 semester credits with at least a 2.50 GPA. For students with an absence of ten or more years, the requirements in guideline number 4 are waived.

5. Academic renewal applies *only* to courses having grades of *D+*, *D*, or *F* and taken prior to readmission. All such courses will remain unaltered on the transcript with the appropriate notation added to the transcript to indicate academic renewal. Courses designated in the petition will not count for computation of GPA for earned credits, nor for satisfying any graduation requirements. Courses with a grade of *C-* (or *P*) or better will be carried forward.

6. Academic renewal will be effective as of the date of the admission following the five- or ten-year absence.

Academic Honesty

The University expects that students and faculty alike maintain the highest standards of academic honesty. For the benefit of students who may not be aware of specific standards of the University concerning academic honesty, the following paragraph is quoted from the *Student Policy Handbook*, Article V, Section 3, Paragraphs a, b, and c:

Section 3. Violations of University Standards

A. The following activities have been found to interfere with University functions or threaten the well-being and the educational purposes of students and are, therefore, specifically prohibited and make the student subject to discipline. The following list of violations is not an all inclusive list; other misconduct may also subject the student to discipline.

1. Acts of academic dishonesty.
   a. Cheating includes intentionally: (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity; (2) depending upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission.
   b. Falsification includes the intentional and unauthorized altering or inventing of any information or citation in an academic exercise or activity.
   c. Plagiarism includes knowingly representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgement. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Violations of the above policy will subject the offender to the University discipline procedures as outlined in Article VI, Section 1 of the *Handbook*.

A. The penalties or disciplinary measures which the University may impose on a student include:
   1. Warning or reprimand—written or verbal.
   2. Grade adjustment—for either an assignment/test or the course.
   3. Probation—continued attendance at the University predicated upon the student satisfying certain requirements as specified by the University. Probation is for a designated period of time and includes the probability of more severe disciplinary penalties if the student does not comply with the specified requirements or is found to be violating any University regulations during the probationary period.
   4. Suspension—temporary dismissal from the University for a specified time, after which the student is eligible to return. Conditions for readmission may be specified.
   5. Expulsion—permanent dismissal from the University.
   6. Extra fee assessments.
   7. Payment of restitution to the University or, when University intervention is deemed appropriate, to another individual for damages or losses.
   8. Withholding of transcripts for refusal to return University property, pay University debts, or other violations of University standards.
   9. Denial or revocation of degrees.
   10. Performance of community service.
   11. Referral to psychological counseling or to the Student Wellness Center for assessment, evaluation, education, and treatment, when necessary.

B. More than one of the penalties or disciplinary measures may be imposed for any single violation. Reference to “penalty” includes multiple penalties.

C. Imposition of the penalty of suspension or expulsion from the University must be approved by the University president. The president's approval shall be given either at the conclusion of the 10-day appeal period if no appeal is filed, or as part of the president's final decision if an appeal is filed.

D. When a student is suspended or expelled from the University, tuition and fees that have been paid for the semester during which the suspension or expulsion occurs are refundable in accordance with the standard refund policy as stated in the semester *Schedule of Classes*.

E. A “packet hold” is not an independent penalty or disciplinary measure, but may be utilized by the Unversity as a means to either direct a student's attention to, and subsequent participation in, a pending disciplinary (or grievance) proceeding, or to obtain the student's compliance with penalties or disciplinary measures which have been imposed, or other action which has been taken, under the Student Code.

Honor Roll (Dean's List)

To qualify for the semester honor roll (Dean's List), a student must earn a 3.5 GPA in 15 or more graded credits except for summer semester, which is 12 graded credit hours. Scholarship “A” pins are presented to undergraduate students who have received all *A* grades (4.0 GPA) for 15 or more graded credits each semester for two consecutive semesters in residence.

Financial Aid and Scholarship Information

Financial Aid Office

Director: Judy LeCheminant, (435) 797-0173
Office in Taggart Student Center 106
WWW http://www.usu.edu/~finaid/

Associate Director: Steven J. Sharp
Assistant Director: Todd Milovich
Assistant Director: Sharon B. Robinette
Computer Specialist: Tamara Adams
Business Manager: Karen S. Marshall
Counselor (A-D): Ho Williams
Counselor (E-K): Cedra H. Jensen
Counselor, Assistant Director (L-Q): Richard Watkins
Counselor (R-Z): Dina Nielson
Scholarship Counselor: Debbie Perrett
Loan and Collection Officer: William E. Jensen, Main 21A

Application for financial aid begins in January for any awarding anticipated during the following academic year. In most instances, early application benefits the applicant. Those who apply early have a greater chance of receiving more aid and of having aid available in time to meet school needs. Some aid is available throughout the year. Contact the Financial Aid Office for assistance.

Scholarships are awarded to qualifying applicants who apply on or before February 1, prior to the academic year. Contact Financial Aid Office for exact deadline.

Financial aid programs, policies, and procedures described herein reflect the latest information at publication. Changes may occur in response to state and federal requirements. Appropriate notice will be made whenever possible before any change takes effect.

For further information concerning financial assistance available for graduate students, see pages 59-60 of this catalog.

Grants, Work-Study, and Loans

Federal Pell Grant. Nonrepayable grant up to $2,700 for which all undergraduates must apply before being considered for any other type of federal aid.

Federal Supplemental Educational Opportunity Grant (SEOG). Nonrepayable grant given to undergraduates with need. The maximum award varies yearly. Awarding is based on need and funding.

State Student Incentive Grant (SSIG). For eligible Utah undergraduates. Awarding is based on need and funding.

Other Grants and Special Benefits. Contact the Financial Aid Office for details concerning BIA or Tribal Grants.

Federal Work-Study (CWS). Provides part-time on-campus and some off-campus employment to enable students to earn a portion of their educational expenses during the college year. Awarding is based on the availability of funds; minimum wage is generally paid to undergraduates.

Federal Perkins Loan (NDSL). Undergraduate students generally may borrow up to $2,400 a year, to a total school amount of not more than $15,000. Graduate students may borrow $3,000 per year, up to $30,000. Monthly payments and interest begin after graduation, withdrawal, or otherwise leaving school, or after dropping below 6 credit hours. A 5 percent simple interest rate applies. Awarding is based on need and funding.

Federal Stafford Loan (GSL). Low, variable interest loans made through a lender such as a bank, credit union, or savings and loan association. Freshmen may apply for up to $2,625 each regular school year; sophomores may apply for up to $3,500 a year; juniors, seniors, and second bachelor's may apply for up to $5,500 a year; and graduates may apply for up to $8,500 a year. Aggregate borrowing limits are $23,000 for undergraduates and second bachelor's, and $65,500 for graduates. Monthly repayment begins after completing or leaving school, or after dropping below 6 credit hours. Interest accrued prior to the beginning of repayment is paid by the federal government for “subsidized” Federal Stafford Loans. Maximum repayment period is 10 years.

PLUS Loans. PLUS loans are for parents who want to borrow for their children's education. This loan provides additional funds for educational expenses and, like Stafford loans, is made through a lender such as a bank, credit union, or savings and loan association. Repayment begins within 60 days after the last loan disbursement. This variable interest loan has an interest rate cap of 10 percent. This loan is available when other awarded federal aid to the student does not fully meet the school's estimated cost of education.

Emergency Loan. Emergency money up to $500 is available for USU students with fees paid for at least 6 credit hours.

Emergency loans are not available for tuition. The duration of emergency loans is eight weeks. A low rate of interest, or service charge, applies.

Method of Awarding Financial Aid

The Financial Aid Office determines a student's yearly cost of education at Utah State University. Residency status has bearing on this cost figure. The student's **family contribution** (the student's financial resources and expected help from family members) is subtracted from the **cost of education.** The **family contribution** is derived from the information provided in the federal financial aid application. Once the application process is completed, using a congressional methodology and processing schedule, the student's **financial need** is determined as the difference between the cost of education and the family contribution. Awarding is based on this difference and available funding.

Estimated Cost of Education for Two Semesters (Based on 1998-99 Costs)

	Resident	Nonresident
Tuition and Fees[1]	$ 2,246	$ 6,802[2]
Room and Board	4,720	4,720
Books and Supplies	800	800
Transportation	1,130	1,130
Personal Expenses	1,620	1,620
Totals	$10,516	$15,072

[1]See complete schedule of tuition and fees on page 14.

[2]See tuition and fee schedule for international students, page 14.

Refund and Repayment Policies

Students who withdraw during the semester may be required to repay all or part of any financial aid received. Consideration is given to the time of withdrawal in the semester and the reason for withdrawing. Students who receive financial aid must meet with their financial aid counselor to withdraw during a semester. See pages 14-15 of this catalog for information on refunding of registration fees.

Responsibility of Financial Aid Recipients

Undergraduate financial aid recipients are expected to achieve a USU GPA of at least 2.0 (3.0 for graduate students), and register for and complete at least 12 credits (6 credits for graduate students) each semester of awarded grant[3], Perkins Loan, or Work-Study aid. The Stafford loan requires a minimum of 6 credits each semester to receive and maintain the award.

If a graduate student has completed all coursework required for his or her degree and has *only* the research component for the degree remaining, he or she may be approved for 3-credit status, and would only need to register for 3 credits to qualify for financial aid (see *Student Classifications*, page 61).

Students not maintaining either the required credits or the required grade point average will be placed on financial aid probation for a minimum of one semester. Students not meeting the required minimums during the period of probation will be suspended from further aid. In exceptional circumstances, students may appeal to have the suspension lifted.

In addition to maintaining academic progress as defined above, recipients may not owe a repayment on grants previously received, or be in default of any student loan fund at USU or any other institution.

[3]Part-time students (less than 12 credit hours) may be eligible for and be awarded Pell Grant aid, but in smaller amounts.

Scholarship Policy

Who can apply. The scholarships listed are those consistently available to Utah State University students. They are awarded through the services of the Financial Aid Office and through the various colleges and academic departments. Some scholarships are awarded without restriction, while others may be limited by certain majors or colleges, class standing, minimum grade point, past accomplishments, financial need, or special qualifications established by the donor. College students, including transfer students, are evaluated on the basis of their college cumulative grade point averages. Students entering from high school are judged on the basis of their high school grade point average and scores from the American College Test (ACT). The ACT test should be taken by at least October of their senior year. A four-point scale is used to determine the cumulative GPA. The scholarship application deadline is February 1.

Waiver Scholarships. These scholarships pay full or partial tuition, provided the undergraduate student is registered for 13 or more credits. Three types of waiver scholarships are offered by USU. (1) *Academic Scholarships* are awarded to incoming students showing academic excellence. (2) *Achievement Scholarships* are awarded to incoming students with exceptional talents, selected student leaders in high school or junior college, or students with regional or national credentials. (3) *University Academic Scholarships* are awarded to students who are or who have been students at USU. Such applicants compete with other students within their college on the basis of their academic records.

Donor Scholarships. Students applying for these scholarships should list them on their scholarship applications, in addition to any applications for the waiver scholarships listed above. Donor scholarships are listed on pages 22-36.

Scholarships and Grants-in-Aid

The following are awarded principally to new undergraduate students:

4-H Scholarships. An applicant for any of these scholarships must have been a Utah 4-H member for at least two years, must be a Utah resident, and must become an active member of Collegiate 4-H. The following scholarships, awarded in the amounts listed, are available:

4-H Achievement—Semester tuition waiver.

Amy Kearsley 4-H Merit—$1,100 per semester.

Fern Kelley Memorial—$400 per semester.

Von H. and Elaine Jarrett—$350 per semester.

Gardner-Ellis Memorial—$350 per semester.

For further details, contact the Utah State 4-H Office, AG S 208, 1-888-4-H Youth (1-888-449-6884).

African-American Leadership Scholarship. An annual scholarship awarded to a graduating high school senior who is an African-American, a Utah resident, and a U.S. Citizen. Recipient must have demonstrated leadership, both in high school and the community, and must have shown special talent and the potential for continued leadership. To receive this award, recipient must carry at least 12 credit hours per semester. For application and more information, contact the Office of High School/College Relations.

Alumni Chapter Scholarships. Full-tuition scholarships awarded to entering freshmen from alumni chapter areas who demonstrate academic achievement, financial need, and personal integrity. Utah high school students may obtain an application from their high school counselor. Out-of-state high school students should contact Alumni Relations, (800) 291-2586, for the address and phone number of their alumni chapter president, who can provide applications. Information and applications are also available from the Office of High School/College Relations.

Alumni Scholarships. Scholarships established by the class of '39 to help offset the cost of nonresident tuition for the children of out-of-state alumni. Primarily for

nonresident students who may not qualify for other academic scholarships. For application and more information, contact the Office of High School/College Relations.

Ezra Taft Benson Scholarship. For entering resident freshmen with a high school grade point average of at least 3.8 and an ACT score of at least 31. High moral standards must be verified by two letters of recommendation. For application and more information, contact the Office of High School/College Relations.

Dee and Belva Broadbent Scholarship—Wasatch High School. Awarded to one boy and one girl graduating from Wasatch High School in Heber City, Utah, to be used for enrollment at Utah State. For application and more information, contact the Office of High School/College Relations.

Marie Eccles Caine Scholarships. Scholarships for incoming freshmen with abilities in the arts. One scholarship will be given to a graduate of each of the following high schools: Bear River, Box Elder, Logan, Mountain Crest, Preston, and Sky View. Recipients must major or minor in the arts. For application and more information, contact the Office of High School/College Relations.

Laurence and Florian Cazier Blackett Scholarships. Awarded to incoming freshmen who demonstrate financial need and can show personal integrity. For application and more information, contact the Office of High School/College Relations.

Competitive Edge Scholarship. Sponsored by Wal-Mart. Applicants must be interested in a career related to manufacturing, industry, or technology; must declare a major in one of the Competitive Edge fields of study; must earn an ACT score of 27 or higher or an SAT score of 1100 or higher; must have a 3.5 or higher cumulative high school grade point average; and must demonstrate community service and leadership. For application and more information, contact the Office of High School/College Relations.

J. Wayne and Roberta H. Fronk Scholarships. Recipients must be graduates of Bear River High School majoring in Elementary Education, Engineering, Business, or Humanities, and must demonstrate financial need. For application and more information, contact the Office of High School/College Relations.

Leo Hawks Scholarship. Recipient must be a graduate of Preston High School. For application and more information, contact the Office of High School/College Relations.

The Weston G. Henrie Scholarship Fund. One or more scholarships are awarded annually to seniors from Logan High School attending Utah State University who have demonstrated high academic achievement in social studies. The scholarship is established in honor of Mr. Henrie who teaches social studies at Logan High School. For application and more information, contact the Office of High School/College Relations.

Melba Brunt Lewis Scholarship. Awarded during alternate years to graduate women from Skyline and Idaho Falls High Schools, in Idaho Falls. The four-year award will be made based on the following criteria: academic—50%, sensitivity to the feelings of others—30%, and financial need—20%. For application and more information, students should contact their high school counselor.

Jason Messerly Memorial Scholarship. Awarded to a graduating senior from Weber High School who has demonstrated leadership abilities during his or her high school career. For application and more information, contact the Office of High School/College Relations.

E. A. Miller Inc. and Conagra Inc. Scholarship. Applicants should demonstrate academic achievement, financial need, and personal integrity. First priority will be given to employees and dependents of E. A. Miller. For application and more information, contact the Office of High School/College Relations.

N. Glen Neeley Scholarship. Nathan Glen and Deta P. Neeley established, in their will, scholarships for worthy students living in Box Elder County, who are completing their senior year at Box Elder or Bear River High School. For application and more information, contact the Office of High School/College Relations.

Melvin Ronald Olsen Scholarship. Recipient must be a male graduate of Snow College and must not be a member of the LDS Church. For application and more information, contact the Office of High School/College Relations.

President's Leadership Council Scholarship. Four-year scholarships awarded to high school leaders. For application and more information, contact the Office of High School/College Relations.

Quadrangle Scholarship. Applicants may not receive another scholarship or tuition waiver. Awards are available to graduate, undergraduate, international, classified dependent, and reentry students. During spring semester, the application procedures for next year's scholarships will be announced in *The Statesman*.

Woodey B. Searle Scholarship. A tuition scholarship is awarded each year by Woodey B. Searle to a needy and deserving graduate of the Uintah High School. Applications should be filed before April 15 with the principal of the UHS at Vernal.

Conway B. and Elaine W. Sonne Scholarship. Recipients shall be graduating high school seniors with leadership experience and potential. Candidates chosen by Mountain West Center for Regional Studies and Office of High School/College Relations. For details, contact Mountain West Center.

Summer Citizens Scholarship. Applicants should demonstrate financial need and academic achievement. Recipients must be graduates of Sky View, Mountain Crest, or Logan High School. Applications are available from high school counselors.

Dr. W. C. Swanson Family Foundation Scholarship. Student recipients should display academic achievement, leadership traits, financial need, and personal integrity. Awards are made to reentry (nontraditional) students, minority students, and incoming freshmen. For application and more information, contact the Office of High School/College Relations.

Tuition Scholarships. The President of the University is authorized by Title 53, Chapter 34, Section 1-a, Utah Code Annotated, 1953, to waive registration and tuition fees in full or in part for a limited number of meritorious or impecunious students who reside in Utah. For application and more information, contact the Office of High School/College Relations.

University Club Scholarships. The University Scholars Program offers the most prestigious scholarships awarded at Utah State University. Each year approximately 20 scholarships are awarded to students who attend a competition held on campus. The scholarship pays tuition and $2,400 per year. In addition, 10 scholarships are awarded by the individual colleges with a cash stipend that varies from $300 to $1,250 per year. For more information and an invitation, contact the High School/College Relations Office.

Women's Center Scholarships and Grants. Awards are based on need, proposed academic and personal goals, and scholarship. Four types of awards are available: **Encouragement Grants.** For women or men who are attending college for the first time and have a gap of at least five years since finishing high school. Must be enrolled for a minimum of 3 credits. Undergraduates only. Residents or nonresidents. **Reentry Grants.** For women or men who have a gap of at least five years at some point in their education. A 2.5 GPA is required. Must be enrolled for a minimum of 6 credits. Undergraduates only. Residents or nonresidents. **Traditional Grants.** For senior or graduate women. Must have a 2.5 GPA or a 3.0 GPA respectively. Must be enrolled for a minimum of 6 credits. Residents or nonresidents. **Tuition Waivers.** For women or men who have a five-year gap at some point in their education, but have been attending college for at least one quarter or semester. A 3.0 GPA is required. Must be enrolled for a minimum of 13 credits. (Any credits over 18 are not covered.) Undergraduates and Utah residents only. Apply in the Women's Center/Reentry Student Center, SC 310.

The following are awarded principally to undergraduate students already enrolled:

Air Force ROTC Scholarship. Arranged for two to four years, this scholarship pays for tuition, fees, books, stipend, plus a nontaxable allowance of $150 per month. Contact USU Air Force ROTC for application and further details or call (435) 797-8723.

The Lieutenant Clyde Parker Baugh Memorial Fund. A gift of Mr. and Mrs. Wilford F. Baugh in memory of their son Clyde Parker Baugh, it provides scholarships annually for deserving students of high scholarship and leadership. Apply in the Financial Aid Office by February 1.

Robert K. Baum Memorial Engineering Scholarship. Two $500 scholarships provided for two students in the College of Engineering. Preferences given to graduates from Wasatch High in Heber City, Utah. The other scholarship(s) given to individual(s) with disabilities. Contact Disability Resource Center, SC 104, or call (435) 797-3434 for application and further details.

Val R. and Ruth Ann Christensen Student Leadership Scholarship. Given to a junior or senior with a USU GPA of 3.0 or higher. Past and present involvement in student government required. Applications available in ASUSU Office, SC 326, after April 1.

The Class of 1927 Gift to the University. Awarded to junior or senior students with scholastic achievement and student leadership at the University. Applications are available at the Financial Aid Office, and are due February 1.

USU Classified Employees Scholarship. An annual scholarship awarded to a son, daughter, spouse, or grandchild of a classified employee. Recipient must be an undergraduate and must carry at least 12 credit hours per semester. Contact Paula Baker, (435) 797-0730 for further details.

The Vern H. and Mabel Cloward Allred Scholarship. Awarded to students with academic achievement, financial need, and personal integrity. Must be enrolled at USU or the Uintah Basin Education Center. Preference shall be given to descendants of Vern and Mabel Cloward Allred. Apply at the Financial Aid Office by February 1.

Marriner S. Eccles and Emma Eccles Jones Scholarship. Established to assist African-American and Hispanic students. Applicant must (1) be a citizen of the United States; (2) be of African-American or Hispanic descent; (3) be capable of succeeding in a University program; and (4) be able to demonstrate need of assistance. Applications available mid-January in Multicultural Office, SC 311K.

Hearing Impaired Student Awards. Various scholarships offered annually to students with documented hearing impairments. Preferences given to students from Broward County in Florida. Awards based on academic standing and financial need. For applications and further details, contact Disability Resource Center, SC 104, or call (435) 797-3434.

The Johansen Scholarship Fund. A gift of Johana Johansen, this provides scholarships annually, for help to worthy students of junior and senior rank. Apply in the Financial Aid Office by February 1.

Lao-American Scholarship. Students must be native to Laos and major in agriculture, education, engineering, forestry, or public health. Applications available mid-January in Multicultural Office, SC 311K.

Helen Lundstrom Panhellenic Scholarship. Given in honor of Dean Lundstrom, this aid is for an undergraduate or graduate female student in a Greek organization. Must have high academic standing and leadership involvement. Applications are available in the ASUSU Office, SC 326.

Merrill O. Maughan Scholarship Fund. One or more scholarships given annually to returned LDS missionaries who have served 18 months or two years in the mission field who are in need of financial aid. Apply in the Financial Aid Office by February 1.

Mortar Board Alumni Scholarship. Offered to members or alumni of Mortar Board, this scholarship can be used for senior year or graduate study at USU. Apply through Women's Center or Mortar Board adviser.

Emma Mosher Scholarship. Unrestricted. Apply in the Financial Aid Office by February 1.

Harold L. Nielson Memorial Scholarship. Memorial scholarship offered to a student with a documented vision impairment. Award based on academic standing and financial need. For application and further details, contact Disability Resource Center, SC 104, or call (435) 797-3434.

Phi Kappa Phi Scholarship. A cash award given to two or three junior students. During spring semester, the application procedures for next year's scholarships will be announced in the *Statesman.*

T.G. Rechow Scholarship. Unrestricted scholarships established in their will by the Rechows. Apply in the Financial Aid Office by February 1.

Harriet Smith Scholarship. Unrestricted. Apply in the Financial Aid Office by February 1.

Snipe-Young Native American Scholarship. Awarded to Native American students, who must be legal North American Indians with at least one-quarter Indian blood. Preference given to students with high GPA. Applications available mid-January in Multicultural Office, SC 311K.

W.C. Swanson Family Foundation for Swanson Foundation Multicultural Scholars. Dr. W. C. Swanson established funding to assist multicultural students, who must show financial need, academic achievement, leadership traits, and personal integrity. Applications available mid-January in Multicultural Office, SC 311K.

Utah State University Emeriti Scholarship. Application should be made by freshmen students who have superior academic qualifications. Applicants must be related to an Emeriti member. For more information, contact Alumni Relations, (435) 797-2055.

The Wallace R. Wayman Memorial Scholarship Fund. From an endowment established by Mr. Wayman, these funds are to help needy students attending USU. Apply in the Financial Aid Office by February 1.

Women's Center Scholarships and Grants. Awards are based on need, proposed academic and personal goals, and scholarship. Four types of awards are available: **Encouragement Grants.** For women or men who are attending college for the first time and have a gap of at least five years since finishing high school. Must be enrolled for a minimum of 3 credits. Undergraduates only. Residents or nonresidents. **Reentry Grants.** For women or men who have a gap of at least five years at some point in their education. A 2.5 GPA is required. Must be enrolled for a minimum of 6 credits. Undergraduates only. Residents or nonresidents. **Traditional Grants.** For senior or graduate women. Must have a 2.5 GPA or a 3.0 GPA respectively. Must be enrolled for a minimum of 6 credits. Residents or nonresidents. **Tuition Waivers.** For women or men who have a five-year gap at some point in their education, but have been attending college for at least one quarter or semester. A 3.0 GPA is required. Must be enrolled for a minimum of 13 credits. (Any credits over 18 are not covered.) Undergraduates and Utah residents only. Apply in the Women's Center/Reentry Student Center, SC 310.

College of Agriculture

Undergraduate Scholarships and Awards

The following scholarships and awards are available to undergraduate students *only*. Applications are available at the College of Agriculture Dean's Office, Agricultural Science 223.

Allen N. and Helen Adams Scholarship. Three scholarships awarded to students who demonstrate academic excellence, financial need, and personal integrity. Preference given to upper-division undergraduate students majoring in Animal Science who are U.S. citizens. One scholarship awarded in each of the following three areas: animal physiology and breeding, animal management and extension, and animal nutrition.

Agricultural Dean's Leadership Award. Two semesters of in-state tuition waiver. To be eligible, the student must (1) have served as or be currently serving as the state of Utah FFA president, (2) have a high school GPA of 3.00 or higher on a four-point system, (3) enroll as a full-time student with courses leading toward a degree in an approved major in the College of Agriculture at USU, (4) maintain a GPA of 3.00 or higher each semester in order to use the waiver the subsequent semester, (5) submit a scholarship application and a transcript of high school and college credits (indicate the years served as state FFA president). These documents should be submitted on or before April 1 of the calendar year prior to the first semester when the waiver is used, and (6) have no other tuition waiver for the semesters this award is to be used.

Agricultural Economics Scholarship. Awards for students majoring in agricultural economics or agribusiness, based on scholastic achievement, need, and performance.

Agricultural Machinery Technology Scholarships. Three or more scolarships awarded to students enrolled in the agricultural machinery technology component of the Agricultural Systems Technology and Education Department. Awards based on financial need and industry restrictions.

Agricultural Systems Technology and Education Department Scholarships. Scholarships or tuition waivers for students majoring in agricultural education and agricultural mechanics.

Alumni Association Scholarships. College of Agriculture Alumni Association scholarship awards of $1,000 to students demonstrating academic achievement, personal integrity, outstanding leadership potential, and financial need.

American Breeders Service Award. One or more awards to deserving students currently enrolled in the Dairy Herdsmen program, based on scholarship, need, leadership, and interest in becoming a dairy herdsman.

Fred A. and Ruth L. Bingham Scholarship. An annual scholarship awarded to an undergraduate student majoring in some field of agriculture. The award is based on high academic standards, superior potential, personal integrity, and a high sense of social and moral responsibility.

Wayne and Lucille S. Binns Scholarship. An endowed scholarship awarded to a junior majoring in Animal, Dairy, or Bioveterinary Science who demonstrates academic achievement, personal integrity, and a high sense of social and moral responsibility.

George T. and Eva B. Blanch Memorial Fund. This scholarship is to be given to upper-division students in agricultural economics with demonstrated academic ability, financial need, and personal integrity.

J. Grant Broadbent Award. One or more awards for students of sophomore, junior, or senior standing on the basis of their potential for making a significant contribution to the range livestock segment of agriculture. They must demonstrate leadership and scholarship.

Cache Valley Cooperative Scholarship. One or more scholarship awards for students majoring in dairy science. Preference given to incoming freshmen with high academic merit.

Cache Valley Select Sires Award. One or more awards to deserving students currently enrolled in the Dairy Herdsmen's Program, based on scholarship, need, leadership, and interest in becoming a dairy herdsman.

George B. Caine Dairy Memorial Scholarship Award. One or more scholarships are awarded annually to outstanding upper-division dairy students as determined by scholarship, leadership, and need. Prof. Caine was the founder and first department head of dairy science at Utah State University.

Campbell Scientific, Inc. Scholarship. Recipients shall be United States citizens majoring in the College of Agriculture.

Evan B. Campbell Scholarship. Awarded to students showing commitment and desire to pursue an education in the College of Agriculture, as demonstrated by extracurricular activities in youth organizations, religious and community service, and academic achievement.

CENEX Cooperative Studies Scholarships. Awards of $600 each for students completing one-year and two-year applied technology programs who complete an agribusiness internship work experience. First-year recipients are eligible for a second year award.

CENEX Foundation Agribusiness Scholarships. Three awards of $750 each for junior or senior students in agriculture who have had academic instruction in farm cooperatives, based on scholastic achievement and leadership qualities, rather than on financial need. Awarded to students from the following states: Colorado, Idaho, Iowa, Kansas, Minnesota, Montana, Nebraska, North Dakota, Oregon, South Dakota, Utah, Washington, Wisconsin, or Wyoming. If awarded to juniors, a $750 scholarship will be available for their senior year, subsequent academic year only, providing they still meet the scholarship criteria.

Richard L. Chase Memorial Scholarship. An award from an endowment fund provided by family, friends, and colleagues of Richard L. Chase is given to an undergraduate student in the Department of Plants, Soils, and Biometeorology who has expressed an interest in weed science. Selection is based on academic achievement and professional potential.

Hung Wo Ching Scholarship. One or more scholarships awarded to students majoring in agricultural economics or agribusiness management. Awards are based on academic acheivement and professional promise.

D. Kenneth Christensen Scholarship. A scholarship awarded to an outstanding student in the Department of Plants, Soils, and Biometeorology majoring in agronomy. Student recipients should demonstrate academic achievement, financial need, and personal integrity. Established to honor the late D. Kenneth Christensen, former chairman and president of Northrup, King & Co.

Alfred E. Clarke Scholarship. A scholarship awarded to an outstanding student in the Department of Plants, Soils, and Biometeorology who demonstrates academic achievement and financial need. Established through the estate of the late Violet May Lory in honor of her late brother, Alfred E. Clarke.

Ralph Garr Cutler Scholarship. One or more scholarships awarded to students majoring in agricultural economics or agribusiness management. Awards based on academic achievement and professional promise.

Dairy Industries Scholarships. Awards for dairy students based on past academic achievements and demonstrated interest in and experience with the dairy industry. The number and amount of each scholarship is dependent on available funds.

Dairy Heifer Contest. Several scholarships are awarded each year based on student performance in a written test and an interview. Contributors include Utah State University, Utah Holstein Association, Cache Valley Select Sires, Trenton Feedlot, Intermountain Farmer's Association, and other individuals and organizations.

Wade G. Dewey Scholarship Award. One or more scholarships will be provided to outstanding junior or senior students from the Plants, Soils, and Biometeorology Department who have a special interest in agronomy and plant breeding. Selection is based on academic performance and potential for professional achievement. These awards are provided by the Utah-Idaho Grain Exchange Endowment established in honor of Dr. Dewey for his contribution to the improvement of cereal grains for the Intermountain Region.

Maurine and C. Anthon Ernstrom Food Science Expendable Scholarship. Recipients should be juniors or seniors majoring in food science.

Barnard and Susan Alvord Farr Scholarship. Recipients should be juniors or seniors majoring in the College of Agriculture, who have a GPA of at least 3.0 and demonstrate financial need.

First Security Foundation Scholarship. Scholarship(s) awarded to a student(s) in agriculture during his or her sophomore or junior year based on merit and need.

Carl O. and Genial Lund Frischknect Award. The recipients of this award should demonstrate academic achievement, financial need, and personal integrity.

William R. Godfrey Scholarship. Awarded to juniors and seniors majoring in the ADVS Department, who have a GPA of at least 3.2 and have demonstrated a willingness and necessity to be employed while pursuing their degrees.

Edwin Gossner, Jr. Family Scholarship. Awarded to juniors or seniors pursuing a degree in either dairy production or dairy processing in the College of Agriculture. The candidate's GPA should not be less than 3.0, nor should GPA be the major criteria for selection. Recipients chosen by the scholarship selection committee of the College of Agriculture.

Heber Valley Livestock Foundation Scholarship. Awarded to a graduating senior attending Wasatch High School, located in Heber, Utah, or to the child or grandchild of a graduate of Wasatch High School.

Andrew L. and Corinne G. Heggie Award. An annual award provided by the Heggie family to be given to a student in the Department of Plants, Soils, and Biometeorology. Recipients will be selected based upon potential in the field of dry land farming, personal integrity, and a high social and ethical sense of responsibility. GPA is a secondary consideration.

Dan and Lloyal Hunter Scholarship. Awards for students majoring in agricultural economics or agribusiness. The award is based on academic performance and professional promise.

Industry Sponsored Scholarships for Agricultural Machinery Technology Students. Awarded to students in the Agricultural Machinery Technology program on the basis of need, leadership, scholastic abilities, and areas of specialization.

Institute of Food Technologists Scholarships. Scholarships of $500-1,000 are available on a nationally competitive basis for students in accredited food science and food technology programs.

Intermountain Golf Course Superintendents Association (IGCSA) Scholarship. Intended for students whose primary interest upon graduation is pursuing a career in the golf turf industry. Previous golf course work experience required. Preference given to students with junior (or higher) standing and a minimum 3.0 GPA.

Frank H. and Pearl L. Jackson Agricultural Endowment Scholarships. One or more scholarships awarded annually to assist future generations of students in the College of Agriculture. Students should demonstrate financial need, personal integrity, quality academic achievement or potential, and a strong sense of performance commitment.

R. Paul and Lorna Larsen Scholarship. Two scholarships awarded to senior or junior horticulture students with special interest in fruit culture, or organic agriculture, and landscape improvement in the Department of Plants, Soils, and Biometeorology. Preference given to students planning a career in university extension service. Selection based on financial need, academic achievement, initiative, superior potential, and personal integrity.

Glenn E. Leggett Memorial Scholarship. One or more scholarships established by Mrs. Glenn E. Leggett to honor her late husband's work in soil fertility and plant nutrition. Scholarships, based on scholastic achievement, are awarded to students who are majoring in the Department of Plants, Soils, and Biometeorology who have an emphasis in soil fertility and/or plant nutrition.

Dr. H. Alan Luke Scholarship. One or more scholarships awarded to upper-division students majoring in agricultural economics or agribusiness management. Awards based on academic achievement and professional promise. Applicants must submit a 400- to 500-word essay on the role they believe governments should play in regulating and/or otherwise influencing the forces of supply of and demand for agricultural products. Recipients must be from a rural county in the Intermountain area.

Hyrum J. MacKay Award. Recipients of this award should demonstrate academic achievement, financial need, and personal integrity.

Milton A. Madsen Memorial Scholarship Fund. An award is given to an undergraduate student majoring in Animal Science, awarded on the basis of scholarship, need, and dedication to the livestock industry. This fund was established by family, friends, and colleagues as a memorial to Dr. Madsen's contributions to the livestock industry and USU.

Arthur W. Mahoney Scholarship. Awarded to a student majoring in Nutrition and Food Sciences demonstrating academic acheivement and financial need.

Arola B. McDonald Dietetics Scholarship. Award of one year's tuition and fees to an undergraduate student, majoring in Nutrition and Food Sciences with a dietetics emphasis, to further training in this field of study.

Marriner Wood Merrill Endowment. Awarded to a student demonstrating quality academic achievement, superior potential, personal integrity, and a high sense of social and moral responsibility.

Darwin Nielsen Scholarship. One or more scholarships to be awarded each year for use in the junior or senior year, on the basis of scholarship and participation in the USU Rodeo Club as a member in good standing.

Major A. and Lucy Nilson Scholarship. Student recipients of the Nilson scholarship must have agricultural backgrounds and must be enrolled in the preveterinary program in the Animal, Dairy and Veterinary Sciences Department.

John E. and Ruth M. Osguthorpe Scholarship. One or more scholarships from an endowment fund initiated by John and Ruth Osguthorpe will be given to students in the Department of Plants, Soils, and Biometeorology with special interest in agronomy. Selection is based on academic achievement, financial need, and personal integrity.

Pacific Northwest Plant Food Association. A scholarship of $500 is given to a sophomore or junior student majoring in agronomy. Offered competitively with other universities.

Lane M. and Anne R. Palmer Scholarship. Candidates should demonstrate financial need and have a minimum 3.0 GPA.

W. Horace Palmer Scholarship. Recipients must be graduates of Milford High School in Milford, Utah, must have a minimum GPA of 3.5, and must demonstrate financial need. Preference given to students enrolled in dairy production.

Pepperidge Farm, Inc. Scholarship. One or more awards for students in food science based on scholarship and dedication to the food industry.

Department of Plants, Soils, and Biometeorology Scholarship. Awarded to outstanding undergraduate students majoring in the department. Selection is based on academic performance and potential for future contributions in agriculture. Special consideration will be given incoming freshmen and transfer students.

Lorin D. Pollard Memorial Scholarship. One scholarship given annually in memory of Lorin Pollard by his parents. Awarded to a student demonstrating quality academic achievement, superior potential, personal integrity, and a high sense of social and moral responsibility. Recipient must be a junior or senior returned LDS missionary.

The Charles Redd Foundation Scholarships. Awarded to agricultural undergraduate students based on need, academic achievement, personal integrity, and responsibility.

Rolla M. Rich Memorial Fund. The interest derived from this fund is to be awarded to a senior student who is a member of the Agriculture Council.

Nelson Ricks Creamery Company Scholarships. Awarded to outstanding freshmen majoring in food science with an interest in dairy processing.

Ritewood Inc. Award. Two awards given annually to students majoring in Nutrition and Food Sciences, one with emphasis in nutrition and the other with emphasis in food science.

Ritewood Inc. Scholarship Endowment. Provides annual awards to a nutrition student and a food science student in the Department of Nutrition and Food Sciences.

Seely-Hinckley Scholarship. A scholarship established as a memorial for John H. Seely and Robert H. Hinckley. Awards based on superior achievement and financial need.

James LeGrande and Faye C. Shupe Scholarship. At least five scholarships awarded as follows: (1) two or more recipients shall be academically worthy sophomore to senior bioveterinary science majors; (2) one to three awards shall be made to incoming freshmen bioveterinary science majors of high academic merit; and (3) two or more awards shall be made to students majoring in fields related to animal health, based on financial need.

Lynne Emilie Sorenson Scholarship. Awarded to graduates of South Summit High School who are pursuing a degree in the College of Agriculture.

Donald L. Staheli Scholarship. Recipients must have minimum GPA of 3.3 and demonstrate financial need.

Stouffer's Scholarships. Awarded to students in the food sciences area of Nutrition and Food Sciences.

Sterling A. Taylor Memorial Scholarship. One or more scholarships donated by Frances Taylor and friends to honor Sterling A. Taylor. Awarded to an outstanding sophomore, junior, or senior in the Department of Plants, Soils, and Biometeorology with special consideration given to students majoring in soil science or biometeorology. Selection is based on high scholastic standing, leadership qualities, and potential in the field of soils or biometeorology.

Utah Association of Conservation Districts Scholarship. Recipients must be junior or senior full-time USU students who graduated from a Utah high school. Candidates must demonstrate academic achievement (with minimum 3.5 GPA) and show financial need.

Utah Dairy Commission. One or more scholarships awarded annually to outstanding junior or senior students majoring in a dairy curriculum or a closely related agricultural major dealing with production, processing, product development, or marketing.

Utah Farm Bureau Federation Scholarships.

a. President's Award. An award of $600 to an undergraduate student in agricultural production.

b. Leadership Award. An award of $600 to the student who has exhibited the greatest measure of growth and excellence in scholarship, constructive organization, and leadership in the College of Agriculture through university courses.

c. Agricultural Education Teaching Scholarship. Awarded to senior students completing requirements for teacher certification in agriculture. Selection based on scholarship, leadership, and financial need.

Utah Feed Manufacturing and Dealer's Association Award. A cash award to an outstanding senior with a major in some phase of animal science, preferably one interested in animal nutrition.

Utah Vocational Agriculture Teachers Association Scholarship. A $500 scholarship awarded to senior students preparing to complete student teaching and certification requirements. Award based on superior achievement and need.

Harris O. and Eleanor Van Orden Endowed Scholarship. Awarded to an undergraduate student majoring in Nutrition and Food Sciences with high academic records.

Ethelwyn B. Wilcox Human Nutrition Scholarship Fund. Awarded to a sophomore through graduate level student in Nutrition and Food Sciences majoring in human nutrition. Student must have maintained superior grades for the preceding academic year and must demonstrate need related to educational costs.

Robert L. Wrigley Scholarship. Awarded to a student majoring in animal husbandry. The award is based on academic achievement, financial need, and personal integrity.

Dale W. and Adele Christensen Young Scholarship. A scholarship provided through an endowment fund established by Dale and Adele Young. Given to outstanding students in the Department of Plants, Soils, and Biometeorology who have special interest in horticulture or agronomy. Special consideration given to students interested in pursuing a career in the agricultural chemical industry or associated agricultural technologies. Selection is based on superior potential, quality academic achievement, personal integrity, and a high sense of social responsibility.

Graduate Scholarships and Awards

The following scholarships and awards are available to graduate students *only.* Applications are available at the College of Agriculture Dean's Office, Agricultural Science 223.

Cache Valley Cooperative Scholarship. Awarded to a graduate student majoring in dairy science or sociology, or with a major in the Department of Economics. Recipient expected to write a master's thesis dealing with some aspect of cooperatives.

William C. Claypool Scholarship. Awarded to a graduate student at USU whose thesis is directed toward the study of some problem of significance to the agriculture of Cache Valley.

Elva Acklam and Arvil L. Stark, PhD Scholarship. One scholarship awarded annually to graduate student in Plants, Soils, and Biometeorology Department, with proposed research in areas of fruit culture, vegetable culture, organic agriculture, or landscape improvement. Preference given to students planning career in horticulture in university extension service. Candidates should demonstrate academic achievement, financial need, initiative, superior potential, and personal integrity.

Joseph C. Street Fund in Toxicology. Established in memory of Prof. Street, this endowment is for graduate students majoring in toxicology to attend scientific meetings in their profession. Contact program chairman for details.

John Shaw Welch Scholarship. An annual award to a graduate student doing research work reflecting the agronomic publications of John Shaw Welch, relating to plant-source food for human consumption, or developing environmentally appropriate pest control. The candidate must demonstrate academic achievement, personal integrity, and financial need.

Undergraduate and Graduate Scholarships and Awards

The following scholarships and awards are available to *both* undergraduate and graduate students. Applications are available at the College of Agriculture Dean's Office, Agricultural Science 223.

Melvin E. Anderson Scholarship. An annual scholarship awarded to a junior, senior, or graduate student in the Department of Plants, Soils, and Biometeorology to honor the late Melvin E. Anderson. Special consideration will be given to students majoring in horticulture or plant breeding. Recipients should demonstrate academic achievement, financial need, and personal integrity.

Ralph S. and Deora Anderson Blackham Scholarship. An endowed scholarship awarded to undergraduate or graduate students studying agriculture. Awards are based on scholarship, accomplishments, and financial need.

Davis County Master Gardener Association Scholarship. A scholarship will be donated to a junior, senior, or graduate student in the Department of Plants, Soils, and Biometeorology. Special consideration will be given to students in horticulture and students from Davis County. Recipients should demonstrate academic achievement, financial need, and commitment to service.

Grace Williams Funk and Kaye Funk Scholarship. Awarded to a Utah resident senior or graduate student in the field of clothing and textiles or food service management.

Niranjan R. and Josephine N. Gandhi Scholarships. Scholarships awarded to outstanding undergraduates and graduate assistants in the Department of Nutrition and Food Sciences.

David S. and Retta W. Jennings Scholarship. An annual scholarship is awarded to an undergraduate or graduate student in the Department of Plants, Soils, and Biometeorology to honor David S. and Retta W. Jennings. Special consideration will be given to students majoring in soil science. Selection is based on academic performance, financial need, and worthiness.

Mr. and Mrs. William W. Owens Scholarship. A scholarship awarded to senior or graduate students in dairy science who demonstrate academic achievement, financial need, and personal integrity.

Utah State Garden Club Scholarship. A scholarship will be awarded to a junior, senior, or graduate student in the field of plant sciences. Student must be a Utah resident and should demonstrate academic excellence.

Dale W. and Adele Young Agricultural Systems Technology Scholarship. For use by undergraduate or graduate students majoring in Agricultural Systems Technology Studies and intending to pursue a career in the agricultural chemical industry or associated agricultural systems technologies such as conservation tillage systems and sustainable agriculture.

College of Business

Undergraduate Scholarships

More than $90,000 in scholarships and tuition waivers are awarded annually in the College of Business. Included in this amount are contributions from the following:

Delonne and Margaret Anderson Scholarship. A $1,400 scholarship awarded to a deserving student.

APICS Scholarship. A $500 scholarship to be awarded to a deserving production major.

James E. Brown Scholarship. An $870 scholarship awarded to a deserving production major.

Professor Vernon M. Buehler '41 Scholarship Honoring Brent Sandberg '85. Annual scholarship based on the earnings of the endowment will be awarded each year to an undergraduate accounting major with promising leadership potential and above average scholastic record.

Professor Vernon M. Buehler '41 Scholarship Honoring Dr. Larzette G. Hale. Annual scholarship awarded to a graduate or undergraduate accounting major with promising leadership potential and above average scholastic record.

Vernon M. and Maree C. Buehler Endowed Scholarship. A $500 scholarship awarded to an Accounting major.

Herschell K. Bullen Scholarship. A $584 scholarship to be awarded to a deserving student.

Business Information Systems and Education Scholarships. One-semester tuition waivers to entering freshmen or transfer students based on academic achievement and an interest in programs in the Business Information Systems and Education Department. Funds provided by the Annual Office Symposium.

Orson A. and Rae N. Christensen Scholarship. Three $300 scholarships to be given to College of Business students who show scholarship, integrity, and leadership.

Darrell and Jean Deem Scholarship. An $800 scholarship awarded to a deserving student.

Farmers Insurance Group. A $700 scholarship awarded to a deserving student for academic achievement.

First Interstate Bank Scholarship. A $2,475 scholarship based on scholastic attainment, need, and parental residence in Utah.

First Security Foundation Scholarship. Two $1,600 scholarships awarded to students of junior or senior standing who are studying banking and finance.

Russell Hanson Business Scholarship. A $200 scholarship awarded to a deserving student for academic achievement.

Floris B. Henderson Scholarship. A $350 scholarship awarded to a student in business education.

David and Barbara Hulme Accounting Scholarship. A $300 scholarship awarded to a deserving accounting major.

Vernon L. Israelsen Scholarship. A $250 scholarship awarded to a junior or senior student majoring in economics, based on academic promise, character, and citizenship.

Key Bank Scholarship. A $1,800 scholarship awarded to a deserving student.

Steve Milovich, Sr. Scholarship. A $1,000 scholarship awarded to a deserving student.

Gus Papanikolas Scholarship. A $300 scholarship awarded to a deserving student.

Seely-Hinckley Scholarship. A $2,100 scholarship for a student with superior academic credentials with a clearly defined program leading to graduate work.

Beatrice Dayton Simmons Scholarship. Two $1,000 scholarships awarded to students who have demonstrated quality academic achievement as well as social and personal integrity.

Harold and Grace Steed Scholarship. A $750 scholarship awarded to a business major with student government experience.

Steve Stokes Scholarship. A $1,000 scholarship awarded to a female business major.

Bert L. and Barbara Palmer Thomas Scholarship. Two $1,000 scholarships awarded to outstanding upper-division students.

H. Ward and Helen Roghaar Thomas Scholarship. A $250 scholarship awarded to a student in business.

Tim Roghaar Thomas Scholarship. A $300 scholarship awarded to a student of junior or senior standing who is majoring in accounting.

University Club Scholar. A four-year scholarship consisting of two-semester waiver plus fees. Awarded to an outstanding entering freshman selected in competition by the College of Business Scholarship Committee.

Robert L. and Patricia W. Wangsgard Scholarship. A $1,500 scholarship awarded to a deserving student.

Western Association of Food Chains Scholarship. A $1,500 scholarship awarded to a deserving student.

Graduate Scholarships

Arthur Andersen & Co. Scholarship. A $1,000 graduate scholarship awarded to a student majoring in accounting.

Coopers & Lybrand Scholarship. A $1,000 scholarship awarded to a deserving student.

Deloitte & Touche Scholarship. A $1,000 graduate scholarship awarded to a deserving student.

Sylvan Erickson Graduate Scholarship. A $500 scholarship awarded to a graduate student in Business Administration based on academic achievement, integrity, and character.

Jones, Wright, Swenson & Simkins Scholarship. A $500 scholarship awarded to a student showing promise for success in the accounting profession.

Roland Monson Scholarship. A $1,000 graduate scholarship awarded to a student majoring in accounting.

Rudd & Company Scholarship. A $500 scholarship awarded to a student majoring in accounting.

Shell Oil Scholarship. A $2,000 award is provided to assist deserving students.

Grant Thornton Scholarship. A $1,000 scholarship awarded to a deserving student majoring in accounting.

College of Business students interested in scholarships need fill out only **one** application form to be considered for **all** business scholarships.

If you have questions about scholarships, contact the director of the College of Business Student Service Center (Business 306). Application forms are available from the College of Business Student Service Center.

College of Education

Undergraduate Scholarships

The following scholarships are available to undergraduate students *only*. Applications are available at the College of Education Dean's Office, Education 109. Application deadline for all scholarships is February 1 of each year.

Oral L. and Tacy C. Ballam Scholarship. Awarded each year to outstanding graduates of a Cache Valley high school who are majoring in elementary education. Preference given to outstanding nontraditional or disadvantaged senior students having financial need and for whom no other scholarship support is available.

Myrtle Sowards DeHart Scholarship in Elementary Education. In honor of Mrs. DeHart, the recipient must exhibit a genuine love for children, along with a sensitivity to the individual personal and academic needs of children. The recipient must exhibit excellent personal mental health, must have the ability to relate in a positive way to parents and co-workers, and must be a hard worker who is willing to devote the time and effort necessary to succeed as a teacher.

Eldon and Janice Drake Academic Scholarship for Juniors. Awarded to a junior student certifying in Secondary Education who has a composite teaching major in social studies, possesses high scholarship, and indicates potential for success as a teacher.

Mary Jane Faylor Scholarship for a Junior Woman in Health, Physical Education and Recreation. Junior women students in the department are eligible to apply for this scholarship, established in memory of her mother by Orpha Faylor Bradley. These recipients should have attained a high scholarship standard; maintain a high ethical standard; be involved in department-sponsored activities, College of Education, University and campus, and community activities; and have a financial need. Selection of the recipient is made by the department head upon recommendation of the Scholarship and Awards Committee. Contact head, Department of HPER.

Clifford and Julie Manning Frye Scholarship. Awarded to an outstanding junior or senior student majoring in elementary education. Preference given to a Navajo student.

Lee and Barbara Hales Family Scholarship. Recipients should be junior or senior students in the Elementary Education Department. Preference given to Logan High School graduates with GPAs between 2.5 and 3.5.

Matthew David Hillyard Endowment Scholarship Fund. Established by Mr. and Mrs. Lyle W. Hillyard in honor of their son, this scholarship is for students in the Special Education and Rehabilitation Department. Contact head, Department of Special Education and Rehabilitation.

H. B. and Ethel Hunsaker Scholarship. All HPER majors are eligible for this award. These recipients should have attained a high scholarship standard; maintain a high ethical standard; be involved in department sponsored activities, College of Education, University and campus, and community activities; and have a financial need. Selection of the recipient is made by departmental faculty upon recommendation of the Scholarship and Awards Committee. Contact head, Department of HPER.

Arthur D. Jackson Scholarship. Recipients, who will be designated Jackson Scholars, must be students majoring in elementary education who demonstrate quality academic achievement, superior teaching potential, and personal integrity.

Ina W. Kurzhals Scholarship. Recipients must be students majoring in elementary education who have high scholastic records and show professional promise in their areas of study.

Ty and Bernice McCowin Scholarship. Awarded to a junior or senior student certifying in Secondary Education who has a composite teaching major in social studies.

Joseph Steven Meyrick Memorial Scholarship. Established by Mr. and Mrs. Stanley Meyrick in honor of their son, this scholarship is for a special education major who has a disability or someone with a disability in his or her family. Contact head, Department of Special Education and Rehabilitation, for additional criteria.

Ethel Miller Scholarship. Designated for a student who is a resident of the Star Valley, Wyoming area and who is enrolled in the College of Education in a major leading towards teacher certification. Recipient must have a minimum cumulative GPA of 3.0 and must have financial need to the extent that he/she would have difficulty completing his/her university program without financial assistance. Contact Dean's Office, College of Education.

Chloe Priday Steward Memorial Fund. Given by Dean and Mrs. L. Mark Neuberger, in memory of their aunt, Mrs. Steward, to an outstanding junior or senior student majoring in elementary education.

Rehabilitation Counseling Personnel Preparation Support Grants. All Rehabilitation Counseling students may apply for these scholarships, which are funded by federal grants to the Department of Special Education and Rehabilitation. Amounts of awards vary. Contact Head, Department of Special Education and Rehabilitation.

Special Education Personnel Preparation Support Scholarships. All students majoring in special education may apply for these scholarships, which are funded by federal grants to the Department of Special Education and Rehabilitation. Amount of awards varies. Contact head, Department of Special Education and Rehabilitation.

Leon G. and Faye Sonne Stucki Scholarship Endowment in Communicative Disorders and Deaf Education. Established by Leon G. and Faye Sonne Stucki, this scholarship is awarded to students having junior class standing, a declared major in Communicative Disorders and Deaf Education, and a grade point average of 3.0 or better.

Leon G. and Faye Sonne Stucki Scholarship Endowment in Special Education and Rehabilitation. Established by Leon G. and Faye Sonne Stucki, this scholarship is awarded to students having junior class standing, a declared major in Special Education and Rehabilitation, and a grade point average of 3.0 or better.

Student Travel Scholarship in Psychology. For psychology students whose papers are accepted by the American Psychological Association to use as partial or full travel expenses to the annual meetings. Contact head, Department of Psychology.

Lucile Kunz Yerger Scholarship. Established by the family of Lucile Kunz Yerger. Awarded to a student studying speech-language pathology who has demonstrated outstanding clinical performance in professional preparation. Contact head, Department of Communicative Disorders and Deaf Education.

Adele C. Young Scholarship in Elementary Education. Established by Dale W. and Adele C. Young in honor of Mrs. Young. Recipients of this scholarship should demonstrate academic achievement, financial need, and personal integrity.

Graduate Scholarship

The following scholarship is available to graduate students *only*.

Walter R. Borg Scholarship. Recipients, to be chosen by a scholarship selection committee of the Psychology Department, should demonstrate academic achievement, financial need, and personal integrity. Applicants must be students in the USU Psychology Department who have already completed at least one year of graduate study. For application, contact head of Department of Psychology.

Undergraduate and Graduate Scholarships

The following scholarships are available to *both* undergraduate and graduate students. Applications are available at the College of Education Dean's Office, Education 109.

Edith Bowen Scholarship. Awarded each year in memory of Miss Edith Bowen from an endowment established by her niece, Stella Young Griffiths. The awards are for junior, senior, and/or graduate students majoring in elementary education.

T. Clair and Enid Johnson Brown Scholarship Endowment Fund. Awarded to full-time undergraduate and graduate students demonstrating academic potential and financial need. Recipients must have been accepted into one of the seven academic departments in the College of Education. Undergraduate recipients must have junior or senior standing and must have attained a minimum cumulative GPA of 3.0. Graduate recipients must have attained a minimum cumulative GPA of 3.5. Contact Dean's Office, College of Education.

The Joanne Lillywhite Christensen Endowment in Communicative Disorders. Mrs. Ray L. Lillywhite established this endowment in memory of her daughter, Joanne Lillywhite Christensen. Recipients of these awards, known as Lillywhite Scholars, are identified annually by the faculty of the Communicative Disorders and Deaf Education Department and represent academic distinction in either undergraduate or graduate education.

Donald F. Kline Scholarship Endowment Fund. Established by family and friends in memory of Donald F. Kline. This scholarship is for an upper-division or graduate student in the Department of Special Education and Rehabilitation who demonstrates superior academic achievement and has financial need.

Dean LeGrande Miller Scholarship in Communicative Disorders. Awards are made annually to senior or graduate students majoring in communicative disorders, who have demonstrated academic excellence despite personal hardships or handicaps. Selection of recipients is made by the departmental faculty, upon recommendation of departmental faculty committees.

Marie Shoup Scholarship. Upper-division and graduate students are eligible for this $500 scholarship. Awards are made on a three-year rotation to senior or graduate students having majors in the departments of Elementary Education, Family and Human Development, and Human Environments. Information and applications may be obtained from these three departments.

Thomas Alva Taylor Scholarship. Established by Edna Cardon Taylor in memory of her husband, Thomas Alva Taylor. Recipients of this scholarship, known as Taylor Scholars, shall be outstanding male senior or graduate students majoring in Elementary Education.

Dale and Adele Young Scholarship. Established by Dale and Adele Young, this scholarship is awarded to full-time undergraduate and graduate students who have been accepted into one of the seven academic departments in the College of Education. Recipients should demonstrate academic achievement, financial need, and personal integrity. Contact Dean's Office, College of Education.

College of Engineering

Undergraduate Scholarships

The following scholarships are available to undergraduate students *only*. Most of these scholarships are reserved for juniors and seniors in the College of Engineering. Freshmen will only be considered if they take the Engineering Scholarship Exam, which is offered annually in conjunction with the University Scholars Competition. Applications for the following scholarships are available at the College of Engineering Dean's Office, Engineering Classroom 110.

Baker/Hughes Engineering Scholarship. A tuition scholarship to be awarded annually to an instate student enrolled in the Mechanical and Aerospace Engineering Department.

Jay R. Bingham Scholarships. Awarded to students majoring in Civil Engineering. Amounts vary each year.

Bourns Scholarship. Awarded annually to two juniors or seniors in Electrical and Computer or Mechanical and Aerospace Engineering. Recipients must be U.S. citizens and residents of Utah. Amounts vary.

James E. Brown Scholarship in Space Sciences, Space Engineering, and Aerospace Corporation Administration. Awarded to undergraduate students in some aspect of space sciences, space engineering, and aerospace corporation administration. The colleges of Business, Engineering, and Science take turns awarding this scholarship each year.

Roy Bullen Memorial Fund for Engineering Students. Approximately $1,000 to be available annually to aid undergraduate engineering students. Established by the late Mrs. Bullen in honor of her husband after whom the fund is named.

Michael B. Bylund Scholarship in Electrical Engineering. Awarded to undergraduate electrical engineering students in their junior or senior year.

CEE Faculty Scholarships. Department of Civil and Environmental Engineering. Available to students entering their junior or senior year. Amounts vary from year to year.

Jerry Christiansen Memorial Engineering Scholarship. Established by Prof. and Mrs. Jerald E. Christiansen in memory of his father, this fund is for students enrolled in the College of Engineering.

Dr. and Mrs. Clayton Clark Engineering Scholarship. Annual grant to support needy students in electrical engineering. Amount varies.

Blaine P. and Louise Christiansen Clyde Engineering Scholarship Fund. The Clydes, alumni of USU, have established these scholarships for students majoring in engineering who have financial need.

W.W. Clyde and Company Engineering Scholarship Fund. Scholarships for undergraduate students majoring in engineering.

Larry S. Cole Electrical Engineering Scholarship. To be used for students in the electrical engineering professional program.

The Philip S. Coolidge Memorial Scholarship. An endowment from the Department of Biological and Irrigation Engineering that gives a two-year upper-division scholarship to students in the field. GPA must be at least 3.25. Contact department head for details. Established in memory of USU student Philip S. Coolidge.

Don M. Corbett Scholarships. Awarded to entering freshman women students in engineering by Mr. and Mrs. Corbett to encourage women in this field. About 25 scholarships are awarded annually.

Charles Thirkell and Pearl Parkinson Darley Scholarship. Awarded to continuing students or transfer students in civil engineering. Amounts vary.

Lehi Davis Scholarship. For undergraduates enrolled in the Department of Civil and Environmental Engineering whose studies emphasize building structures.

Bertis L. and Anna E. Embry Scholarship. To be used for students in biological and irrigation engineering and electrical and computer engineering.

Mark K. Fjeldsted Scholarship in Civil and Environmental Engineering. A $1,000 scholarship given annually. Recipients must be U.S. citizens.

Forsgren Associates Scholarship in Civil and Environmental Engineering. Awarded annually to an outstanding student enrolled or to be enrolled at USU.

Parker Hannifin Corporation Scholarship. Awarded to a student majoring in mechanical engineering.

Dee and Linda Hansen Scholarship in Civil and Environmental Engineering. For juniors and seniors with a major in the Department of Civil and Environmental Engineering.

Industrial Technology Scholarships. Several $500 scholarships given annually to students in industrial technology.

LeGrand Johnson Memorial Scholarship. Department of Civil and Environmental Engineering. Available to students entering their junior or senior year. Amounts vary from year to year.

Max LeGrand Johnson Memorial Engineering Scholarships. One or two scholarships awarded annually to students majoring in civil engineering.

Kennecott Corporation Scholarships. Awarded to students in civil engineering, environmental engineering, or industrial hygiene.

William H. Kibbie Aviation Scholarship. Awarded to students in the flight technology program with demonstrated need and significant progress in the program.

George A. and Ivalou Keller Lawrence Scholarships in Civil and Environmental Engineering. Awarded annually on the basis of academic performance and financial need.

Professor Harold R. Kepner Memorial Scholarship in Engineering. One or more scholarships given annually to students demonstrating academic achievement and financial need.

Austin and Geniel Loveless Scholarship in Industrial Teacher Education. Awarded during the semester in which the recipient does student teaching.

Mechanical Engineering Alumni and Faculty Scholarship. Student must have a high GPA and be pursuing a degree in mechanical engineering.

Charles N. Merkley Memorial Scholarship in the Department of Industrial Technology and Education. One or more scholarships given annually to U.S. citizens demonstrating academic achievement and financial need.

E. Joe Middlebrooks Scholarship. An annual scholarship for a woman or minority engineering student.

Henry J. and Rebecca Henderson Nelson Memorial Scholarship in Engineering. Established by Prof. and Mrs. Jerald E. Christiansen in memory of her parents, this endowment is for students enrolled in the College of Engineering.

Nielsen, Maxwell, Wangsgard Scholarship. Awarded annually to a student in the Civil and Environmental Engineering Department. Student must be interested in consulting engineering.

Parker Hannifin Scholarship. One scholarship given annually to a junior or senior engineering student.

Jack B. and Bonnie F. Parson Scholarships in Engineering. Grants awarded to students of at least sophomore status, who show superior scholarship ability, a commitment to high social and moral values, and financial need.

Dean F. and Bessie C. Peterson Scholarship in Engineering. Available to students in the Department of Civil and Environmental Engineering.

Harold and Else Peterson Scholarships. Awarded annually on the basis of academic performance and financial need.

Questar Corporation Scholarship. Awarded to an engineering student with financial need.

Ace and Arville Raymond Scholarship in Engineering. Awarded annually to an outstanding and worthy undergraduate in the College of Engineering.

Carlyle and Elliot Rich Scholarship. Awarded to students majoring in the Department of Civil and Environmental Engineering on the basis of academic achievement, superior potential, and personal integrity.

Charles Carlyle Rich Engineering Scholarship. Established in Mr. Rich's memory for students enrolled in civil engineering.

Lowell R. and Afton T. Rich Scholarship in Civil and Environmental Engineering. Awarded to undergraduate students. Amount varies.

David Rider Scholarship in Civil and Environmental Engineering. Awarded annually to juniors and seniors on the basis of financial need.

Harold W. and Helen Ritchey Engineering Scholarship. A $5,000 scholarship granted to an incoming freshman student for four years of study.

Peggy R. Roskelley Memorial Scholarship for Women. For a female engineering student with financial need. Awarded to juniors and seniors.

SME Scholarship. Student must have a high GPA and be pursuing a degree in mechanical engineering with a manufacturing option.

Carl and Nadeane Spear Scholarship. Awarded to a junior or senior student majoring in either Mechanical or Manufacturing Engineering.

Sidney R. Stock Scholarship in Electrical Engineering. Given in memory of the founder of the department, this scholarship is for students majoring in electrical engineering.

Ivan M. and Ruth C. Teuscher Memorial Scholarship. Tuition scholarships for students in the College of Engineering.

Edwin P. Van Leuven Scholarship. Awarded to students who will be teaching in the fields of industrial and technical education. Given by Mr. and Mrs. Van Leuven, leaders in this subject.

Woodward-Clyde Engineering Scholarship. For undergraduate students in the Civil and Environmental Engineering Department.

Graduate Scholarship

The following scholarship is available to graduate students *only.* Application is available at the Department of Civil and Environmental Engineering Office, Engineering Laboratory 211.

William A. Cordon Scholarship. Department of Civil and Environmental Engineering. A scholarship for a graduate student to research concrete materials.

Undergraduate and Graduate Scholarships

The following scholarships are available to *both* undergraduate and graduate students. Application is available at the College of Engineering Dean's Office, Engineering Classroom 110.

A. Alvin and Anna Beth Reeder Bishop Biological and Irrigation Engineering Scholarship. Awarded to junior, senior, and graduate students in Biological and Irrigation Engineering.

Frank Kelsey Memorial Aviation Scholarship in the Department of Industrial Technology and Education. Awarded to an undergraduate or graduate student enrolled in the Flight Training Program.

David R. Miller Memorial Scholarship in Civil and Environmental Engineering. One or more full tuition and fees scholarships given annually to undergraduate or graduate students. Preference will be given to those with financial need.

Larry E. Roberts Scholarship in Electrical Engineering. One or more scholarships representing full tuition and fees for one year for undergraduate or graduate students.

College of Family Life

Undergraduate Scholarships

The following scholarships are available to undergraduate students *only*. Applications are available at the College of Family Life Dean's Office, Family Life 205.

Thelma Faylor Allison (Class of 1927) Endowment. Awarded to outstanding junior or senior women majoring in the College of Family Life.

Margaret F. Anderson (Class of 1952) Endowment. Established by DeLonne Anderson and Margaret F. Anderson. Recipients should demonstrate financial need and personal integrity. Scholarship recipients may receive this scholarship for more than one year.

Edna Hatch Baker (Class of 1925) Endowment. Presented to students majoring in either Family and Human Development or Family and Consumer Sciences Education who demonstrate academic achievement, financial need, and personal integrity.

Flora Howard Bardwell (Class of 1964) Endowment. Established by friends and family of Flora H. Bardwell. Recipients should demonstrate academic achievement, financial need, and personal integrity.

Anna Beth Reeder Bishop (Class of 1938) and A. Alvin Bishop Endowment. Awarded to a junior or senior student with a record of excellence in scholarship, with preference to be given to a U.S. citizen and a member of Phi Upsilon Omicron.

Joan F. Budge Endowment. Established in memory of Joan Budge by her husband, children, and friends. Awarded to an undergraduate student in any discipline.

Annie (Nan) Nibley Bullen Endowment. A scholarship presented to a student majoring in Family and Consumer Sciences Education who demonstrates financial need and personal integrity.

Ellen Kathleen Powell Burton (Class of 1925) Endowment. Awarded in memory of Mrs. Burton by her daughter, Janice, to an undergraduate with a record of scholarship and achievement. Preference given to a student majoring in Family and Consumer Sciences Education.

Dr. Barbara G. Christensen (Class of 1968) Endowment. Established in memory of Barbara G. Christensen by Una E. Christensen for students demonstrating financial need and personal integrity.

College of Family Life Endowment. Scholarships provided by contributions given by alumnae, alumni, and friends of the College of Family Life to worthy students who show outstanding promise.

Susie Sanford Cook (Class of 1927) Endowment. A scholarship presented to junior or senior women who show academic achievement and financial need.

Ruth Swenson Eyre (Class of 1951) Early Childhood Education Scholarship. Presented each year to an undergraduate student majoring in Early Childhood Education and with special interest in Alternative Preschool and Day-care Curricula which emphasize and enhance the emotional and social growth of children. The scholarship was established by Mrs. Eyre's sons.

Mary Jane Faylor Endowment. Junior or senior women students in the College of Family Life are eligible to apply for this scholarship established by Thelma Faylor Allison (class of 1927) in memory of her mother.

Orpha Faylor Endowment. A scholarship awarded by Thelma Faylor Allison, in memory of her sister, to outstanding junior or senior women majoring in Interior Design.

Coy Fife (Class of 1929) Endowment. Coy Fife established this scholarship endowment to assist needy and deserving direct descendants of her brother and two sisters in their educational endeavors in any discipline at USU. Applicants must demonstrate financial need, personal integrity, and scholastic potential, as attested to by three letters of recommendation from reputable sources. If no Fife family members apply, the scholarship will be made available to eligible students in the College of Family Life.

Carrie Johnson Fullen (Class of 1985) Scholarship. A scholarship established by Mrs. Jane Shoup Johnson to honor her daughter, a graduate of the College of Family Life.

Stella Young Griffiths (Class of 1919) Endowment. Established by Mrs. Griffiths for an outstanding undergraduate student.

Barbara Fitzgerald Hulme (Class of 1944) and David K. Hulme Endowment. Presented to students majoring in Apparel Merchandising who demonstrate achievement and financial need.

Maurine Robson Humphris (Class of 1947) Endowment. A scholarship awarded to a junior or senior student with a record of excellence in scholarship who is majoring in Family and Consumer Sciences Education.

Katie Karikka (Class of 1938) Endowment. For high school seniors who will enter the College of Family Life majoring in Family and Consumer Sciences Education at USU.

Janet Marchant Luke (Class of 1956) Endowment. Available to students who are majoring in Family and Consumer Sciences Education or in the departments of Family and Human Development or Nutrition and Food Sciences. The students must

demonstrate academic achievement, personal integrity, and financial need, with first preference given to direct descendants of Albert Harper Marchant or John Henry Luke. Upper-class students in need of financial assistance shall receive preference.

Eliza B. Mackay Endowment in Family and Consumer Sciences Education. Established by Reed B. Mackay in memory of his mother, Eliza B. Mackay. The student recipient should demonstrate academic achievement, financial need, and personal integrity.

Arola B. McDonald (Class of 1937) Dietetics Endowment. A scholarship presented to an undergraduate dietetics student. Provided by Mr. and Mrs. Leonard W. McDonald.

Johanna Moen Memorial Endowment. A scholarship in memory of Johanna Moen given to worthy students in the College of Family Life who show outstanding aptitude in the field.

Gwen Weston Peterson Endowment. Established for a junior student majoring in Interior Design in memory of Gwen Peterson by her husband Odell F. Peterson, and her family.

Ritewood Inc. Endowment. Provides scholarships to a nutrition student and a food science student in the Department of Nutrition and Food Sciences.

Seely-Hinckley Endowment. A scholarship for a student of superior attainment and demonstrated need who has a clearly defined academic program leading toward post-graduate work in food sciences and nutrition.

Marie Stowell Shoup Memorial Endowment. A scholarship established in memory of Mrs. Shoup by her husband and daughters for an upper-division woman student in Human Environments, based on scholarship and need.

Helen Lower Simmons (Class of 1952) Endowment. For students showing financial need, personal integrity, and academic achievement.

Nedra Wright Stevens (Class of 1958) Memorial and Major General Lynn H. Stevens Endowment. For a junior or senior student majoring in the Department of Human Environments.

Helen Thackeray Stevenson Endowment. Awarded to students demonstrating academic achievement, financial need, and personal integrity.

Ila Smith Taggart (Class of 1936) Endowment. Student recipients should demonstrate academic achievement and financial need.

Frances G. Taylor (Class of 1941) Phi Upsilon Omicron Endowment. Awarded to a U.S. citizen who is an active member of Kappa Chapter, Phi Upsilon Omicron.

Dr. Harris O. and Eleanor Y. Van Orden Endowment. A scholarship for an undergraduate nutrition and food sciences major with high academic record.

Angelyn Wadley Endowment. A scholarship to an outstanding student in the College of Family Life provided by the Wadley family and friends in memory of Angelyn Wadley.

Nancy Burton Wagstaff (Class of 1958) Endowment. Established in honor of Nancy Burton Wagstaff by her husband and friends. For students having financial need and showing academic achievement, with preference given to students majoring in Family and Consumer Sciences Education.

Helen Maughan Walker Endowment. Awarded to junior or senior students demonstrating academic achievement and showing financial need.

Dorothy B. Wanlass Endowment. Interest is used to support the mission and goals of the College of Family Life.

Reva Lewis White (Class of 1922) Endowment. Established in memory of Reva White by her children, Katherine W. Dumke and the late W. Robert White, for an outstanding student.

Dr. Dale W. and Adele Christensen Young (Class of 1942) Endowment. Established for students who show academic achievement, personal integrity, and superior potential.

Graduate Scholarships

The following scholarships are available to graduate students *only*.

Dr. Don C. Carter Graduate Fellowship. A memorial for former USU College of Family Life Professor Carter. This award is for graduate students majoring in Family and Human Development. Contact FHD Department for details.

Dr. Arthur W. Mahoney Endowment in Nutrition and Food Sciences. A memorial scholarship established by Sylvia M. Mahoney, family, and friends. Recipients must be graduate students with a major in the Department of Nutrition and Food Sciences who demonstrate academic achievement and financial need.

Dr. Phyllis R. Snow Graduate Endowment. Established in honor of Phyllis R. Snow, former dean of the College of Family Life. This scholarship is given to a graduate student of high academic standing and potential.

Leah D. Widtsoe Graduate Endowment. Presented to a graduate student in the College of Family Life. The fund was established by Dr. Virginia Cutler in memory of Mrs. Widtsoe.

Undergraduate and Graduate Scholarships

The following scholarships are available to *both* undergraduate and graduate students. Applications are available at the College of Family Life Dean's Office, Family Life 205.

Clara L. Budge (Class of 1930) Endowment. A scholarship established in memory of Mrs. Budge by her husband and son. This scholarship is for undergraduate or graduate students who show personal integrity, superior potential, and academic achievement.

Grace Williams Funk and Dr. Kaye Funk (Class of 1946) Endowment. A scholarship to a Utah resident senior or graduate student in the field of clothing and textiles or food service management.

Dr. Niranjan R. Gandhi (Class of 1970) and Josephine N. Gandhi Endowment. Awarded to outstanding undergraduate and graduate students with majors in the Department of Nutrition and Food Sciences.

Dr. Ethelyn O. Greaves Memorial Endowment. An endowment established in memory of Ethelyn Greaves, former dean of the College of Family Life, by Marguerite Greaves, M.D., for a promising sophomore, junior, senior, or graduate student with financial need.

Theta Johnson (Class of 1938) Endowment. The recipient is to be an outstanding senior or graduate student whose area of study is either clothing and textiles or Family and Consumer Sciences Education, with preference for an individual with 4-H experience.

Maurine Flint Keller (Class of 1932) Memorial Endowment. A scholarship established in memory of his wife by Paul D. Keller for an outstanding undergraduate or graduate student in Human Environments.

Charles N. and Dr. Margaret B. Merkley (Class of 1952) Endowment. Student recipients should demonstrate academic acheivement, financial need, and personal integrity. Students must be committed to a career in one of the fields encompassed by the course of study in the College of Family Life. Recipients must be upper-class or graduate students. The endowment is not renewable.

Dr. Eldrow (Dutch) and Marjorie Seely Reeve (Class of 1940) Endowment. A scholarship for graduate and undergraduate students that show academic achievement, personal integrity, and superior potential.

Gregory Carl Trevers (Class of 1972) Memorial Endowment. A scholarship for undergraduate and graduate students in Family and Human Development established by Cherie and Mercer Trevers and Loretta Trevers.

Kathryn C. Wanlass Scholarship. Awarded to a graduate Interior Design student, and to a junior or senior in Family and Human Development or Interior Design.

Dr. Ethelwyn B. Wilcox Endowment. Awarded to worthy students majoring in human nutrition at the graduate or undergraduate level.

College of Humanities, Arts and Social Sciences

Undergraduate Scholarships

The following scholarships are available to undergraduate students *only*. Applications are available at the College of HASS Dean's Office, Main 338.

Ahmanson Art Education Scholarship. Awarded annually to outstanding Art Education majors in their junior or senior year. Contact Department of Art for details.

Wendell B. Anderson Scholarship. In honor of Dr. Anderson, political science professor, this scholarship is given to an outstanding political science major who is also an athlete. Awarded on the basis of GPA and a commitment to succeed in political science. For details, contact Department of Political Science.

J. Duncan Brite Scholarship. In honor of Professor Emeritus Brite, this scholarship is available to outstanding undergraduate history majors. Contact History Department for details.

Asa and Vivian Bullen Prelaw Scholarship. Donated in memory of his parents by Richard H. Bullen, this endowment provides resident tuition scholarships for two

outstanding prelaw students, senior year only. For details, contact Political Science Department.

Helen Bullen Music Scholarship. Awarded to a deserving music student on the basis of financial need. For details, contact Music Department.

Cynthia Farr Bylund Scholarship. This endowment, established by Cynthia Farr Bylund, a 1978 Political Science graduate, honors a junior or senior in Political Science who demonstrates superior potential in the field, personal integrity, and high social and ethical responsibility. GPA is not the main criteria for selection. For details, contact Department of Political Science.

O. Guy Cardon and M.N. Neuberger Scholarship in Social Science. The Bluebird Candy Company at Logan offers a scholarship in the social sciences, in honor of the late O. Guy Cardon and of the late M. N. Neuberger. Students are nominated by the College of HASS dean's office. (Applications not accepted.)

Louise Christiansen Clyde English Scholarship Fund. This endowment, established in honor of Mrs. Clyde, a 1941 USU graduate in English, is for undergraduate students majoring in English. Contact English Department for details.

Carl T. Degener Scholarship. Prof. Degener left a bequest for deserving juniors who are majoring in languages at Utah State University. Contact Department of Languages and Philosophy for details and application.

Department of English Book Scholarship. Awards for undergraduate students majoring in English. Selection based upon academic accomplishments and financial need. For details, contact English Department.

J.C. Fonnesbeck Scholarship in English. Students majoring in English with financial need and high academic standing may apply for this scholarship, established in memory of her father by Alice Fonnesbeck Gardner. Contact Department of English for details.

Donna B. Gossner Scholarship in Music. Recipients should be sophomore, junior, or senior students majoring in piano with a pedagogy emphasis. A minimum GPA of 3.3 and demonstration of financial need are required. For details, contact Music Department.

LuAnn M. Hamilton Memorial Scholarship. Established by family and friends in memory of Miss Hamilton, a baccalaureate graduate of the USU Social Work Program. Earnings from the fund are awarded to a junior or first semester senior social work student, on the basis of scholarship, initiative, character, and professional promise. Contact Social Work faculty for details.

Peter O. Holmgren Humanities Scholarship. Awarded to students in the humanities division of the College of HASS. For application and more details, contact English Department.

Virginia Summerhays and Allen Quentin Howard Scholarship. Recipients shall be in the top 10 percent of music students and shall submit a written application, three letters of recommendation, and a 500 word essay. For more details, contact Music Department.

ICMA Scholarship in Newspaper Management. A scholarship offered by the International Circulation Manager's Association, the Newspaper Center, Reston, Virginia. First preference is given to juniors and seniors with an interest in newspaper circulation management. Two awards annually. Administered by the Department of Communication. Check with department for application details.

Lieutenant Peter "Joe" Lacey Scholarship. Student recipients of this scholarship must be juniors who are married, demonstrate financial need, and are contracted military cadets. Contact Aerospace Studies Department for details.

George A. and Ivalou Lawrence Scholarship. Recipients should demonstrate a high level of vocal or instrumental achievement, a 3.0 or higher GPA, integrity, and a high sense of social and moral responsibility. For details, contact Music Department.

Carolyn Tueller Lewis Memorial Vocal Scholarship. Awarded to outstanding voice students. For details, contact Music Department.

Evelyn Hodges and Theodore R. E. Lewis Social Work Scholarship. In honor of Evelyn Lewis, USU's first faculty member in Social Work, and her husband Theodore, this scholarship is awarded to undergraduate social work majors, maintaining a 3.0 GPA and showing promise for success in social work. For details, contact Department of Sociology, Social Work and Anthroplogy.

Music Department Scholarships. The USU Music Department gives scholarships to incoming students and those currently enrolled in the areas of orchestra, band, vocal, piano, and organ. Contact Music Department for details.

George B. Pahtz Memorial Scholarships. Symphony orchestra scholarships. Contact Department of Music for details.

N. A. Pedersen Scholarship in English. Undergraduate students majoring in English, who have high academic standing and financial need, may apply for this scholarship given in the memory of Dr. N. A. Pedersen, former department chairman and dean at USU. Contact Department of English for details.

Presser Scholarship. A full tuition scholarship for one year to be awarded to an outstanding music major currently in his/her junior year. Contact Music Department for details.

Social Work Scholarships. Earnings from an endowment fund established in 1937 provide an annual scholarship award for a student majoring in social work. Junior and senior women in social work are eligible for consideration. The amount of the grant varies from $100 to $200 per student. Contact Department of Sociology, Social Work and Anthropology for details.

Conway B. and Elaine W. Sonne Scholarship. Recipients shall be graduating high school seniors with leadership experience and potential. Candidates chosen by Mountain West Center for Regional Studies and Office of High School/College Relations. For details, contact Mountain West Center.

Gwendella Thornley Memorial Scholarship. Awarded to students who are in their junior year and who are majoring in oral interpretation. Contact Department of Theatre Arts for details.

Josey Barnes Wayman Scholarship in Broadcast Journalism. Established by a 1951 USU communication graduate who was a pioneer for women in broadcast journalism, the Wayman Scholarship offers stipends of $800 to junior and senior women in broadcast journalism who demonstrate academic achievement and financial need, and who intend careers in broadcasting. For details, contact Department of Communication.

Josey Barnes Wayman Theatre Arts Scholarship. A scholarship endowed by USU alumna Josey Barnes Wayman to be awarded to outstanding junior or senior female students majoring in theatre who demonstrate high academic standing and financial need. For details, contact Department of Theatre Arts.

John S. and Unita Welch Prelaw Scholarship. Provides resident tuition scholarships, senior year only, for outstanding students who intend to pursue law as a profession. For details, contact Department of Political Science.

Esther V. Erickson Wrigley Scholarship. The Robert L. Wrigley family presents two scholarships annually to English majors in memory of Mrs. Wrigley. Scholarships are given to outstanding students of sophomore and junior standing. Contact Department of English for details.

Graduate Scholarships

The following scholarships are available to graduate students *only*. Applications are available at the College of HASS Dean's Office, Main 338.

S. George Ellsworth Graduate Editorial Fellowship. Awarded to a graduate editorial student enrolled in the master's program in history. For details, contact Mountain West Center for Regional Studies.

Larry Elsner Scholarship. In honor of Professor Elsner, this scholarship is given to graduate students demonstrating potential in sculpture and other three-dimensional art forms. For details, contact Art Department.

Earl A. and Carmen D. Fredrickson Fellowship in Sociology. Limited to first-year graduate students in sociology. Earnings from an endowment fund of $10,000 established in 1974 provide a fellowship award once every two or three years. The fellowship award will amount to about $2,000 for the academic year. The Sociology, Social Work and Anthropology Department supervises the funds and selects the fellowship recipient from among the first-year sociology graduate students.

Joseph A. and Grace W. Geddes Research Scholarship. For full-time graduate students majoring in sociology to use for research. Contact department chairman for details.

Noni Eccles Harrison Graduate Fellowship. A grant to a graduate student in ceramics selected by the head of the ceramics program to further study in ceramics from a generous endowment given by Mrs. Harrison. Contact Department of Art for details.

Jon Morgan Fellowship. Recipient shall be a graduate student majoring in art who demonstrates academic achievement and financial need. For details, contact Art Department.

Lowry and Florence Nelson Fellowship in Rural Sociology. Established in honor of Lowry Nelson, one of the world's foremost rural sociologists, and his wife Florence. For details, contact Sociology Graduate Program or Mountain West Center for Regional Studies.

Charles S. Peterson Editorial Fellowship. May be used as a graduate student summer research award. For details, contact Mountain West Center for Regional Studies or History Department.

R. Welling Roskelley International Development Scholarship. Initiated by the family and friends of the late Dr. R. Welling Roskelley, a professor of sociology who was largely responsible for initiating the international development activities of the social science community at USU. Graduate students majoring in sociology and interested in international development may apply. For details, contact Sociology Graduate Program.

Teaching Assistant. Department of Communication; $4,000 with tuition waivers available; graduate student only. Apply through Department of Communication.

Undergraduate and Graduate Scholarships

The following scholarships are available to *both* undergraduate and graduate students. Applications are available at the College of HASS Dean's Office, Main 338.

USU Anthropology Scholarship. Established by members of USU anthropology faculty. Recipients must be anthropology majors. Scholarship may not be given yearly. For details, contact Sociology, Social Work and Anthropology Department.

George B. and Marie Eccles Caine Scholarship in Music, Art, and Theatre. These scholarships are given in each of the three departments named to students attending USU. Contact one of the departments above for details.

Mabel Walker Carlson English Scholarship. Awarded to English majors in need of financial assistance. Contact English Department for details.

Carlton and Edna Culmsee Scholarship. Recipients of the Culmsee Scholarship should demonstrate academic achievement and financial need. For details, contact English Department.

David E. and Leona E. Daley Theatre Arts Scholarship. This memorial scholarship was established by the late Mrs. Daley for undergraduate or graduate students majoring in theatre arts, who have financial need. Contact department for details.

Ellen Stoddard Eccles Scholarship. An endowment given by Noni Eccles Harrison in memory of her late mother, after whom the fund is named. This scholarship is open to junior, senior, or graduate ceramic majors. For details, contact Art Department.

Frank Blair and Minnie Fisher Ellsworth Music Scholarship. Awarded to a music student on the basis of academic achievement, financial need, and personal integrity. For details, contact Music Department.

S. George Ellsworth Scholarship. Available to both undergraduate and graduate students majoring in history. For more information, contact History Department.

Jay W. Glasmann Family Scholarship. Endowed by the former owners of the *Ogden Standard Examiner,* the Glasmann Family Endowment funds two $1,000 scholarships for students with demonstrated high academic achievement, having leadership potential, and who intend to pursue journalism careers. Preference to candidates from Weber, Box Elder, Morgan, and Davis Counties. For application details, contact Department of Communication.

Illustration Scholarship. Awarded to illustration majors in Art Department. For more details, contact Department of Art.

Jean Inness Scholarship. This scholarship is for an upper-division or graduate student attending USU who has maintained at least a 3.0 GPA during the preceding academic year. Although the primary interest is French, Spanish may be substituted if there is no acceptable candidate. Contact Department of Languages and Philosophy, Main 204, for application and details.

David L. Jensen LAEP Scholarship. This endowed scholarship is awarded yearly to either an undergraduate or graduate student in the Department of Landscape Architecture and Environmental Planning. Contact LAEP Department for details.

Garth N. and Verda Marie Clegg-Jones and Family Scholarship. Awarded to graduate or undergraduate students majoring in humanities or social sciences. For details, contact the Mountain West Center for Regional Studies.

Glacus G. and Marie B. Merrill Scholarship. Funded by the generosity of a radio pioneer in Cache Valley, the Merrill Endowment provides up to two $500 scholarships for promising communication majors, with preference given to students from Cache Valley who are interested in broadcasting. For details, contact Communication Department.

Floyd T. Morgan Endowment Fund. In honor of the former Theatre Arts Department head, this scholarship is awarded to an upper-division or graduate theatre arts major. Contact Department of Theatre Arts for details.

Morris Traveling Fellowship Fund. Prof. Morris, who established the LAEP Department at USU, and his family have endowed this fund for LAEP students' educational travel outside of North America. Contact Department of LAEP for details.

Preston Nibley History Scholarship. A full tuition scholarship for one year to be awarded to an outstanding history student. Contact History Department for details.

Arthur and Diana Norris Scholarship. Awarded to graduate student in ceramics, but also available for junior or senior undergraduate in ceramics. Student should show talent and financial need. For details, contact Department of Art.

Edward C. Pease Scholarship. Established by head of Communication Department to support excellence in student enterprise in journalism and mass communications practice, this $500 award is intended for a student with proven ambition and accomplishment in journalistic writing and practice, who will pursue journalistic projects during the scholarship year.

Wilford D. Porter Memorial Scholarship. Endowed by Communication Department alumni and friends in memory of their professor, Wilford D. Porter, this scholarship of $175 is for students who demonstrate the high journalistic standards and academic achievement to which Professor Porter dedicated his career. For details, contact Department of Communication.

Lucile C. Reading Scholarship for Students of Children's Literature. A bequest from Mrs. Reading, who wrote and edited children's literature, for English majors at USU who plan to teach, study, or write for children. Contact English Department for details.

Walter Siegenthaler Scholarship. Established in honor of a Nashville, Tennessee newspaperman, the Seigenthaler Scholarship earmarks $500 scholarships for students demonstrating academic achievement and financial need, and interested in the business-side operations of mass communications. For details, contact Communication Department.

Ralph Jennings Smith Creative Writing Scholarship. An award consisting of one semester's tuition and fees is presented to an undergraduate or graduate student who is a serious creative writer. Recipient is selected based on a creative writing contest. Contact English Department for details.

W. Mont Timmins Essay on the Pioneering of Cache Valley. A cash prize is awarded by the Timmins family for the best essay on an aspect of pioneering in this valley, from earliest recorded times to present. Open to all undergraduates and graduates. Details from USU History Department.

Utah State Theatre Talent Awards. Several awards of $200 to $400 are given each year to outstanding students entering or already enrolled as theatre arts majors. Applicants must audition and be interviewed. Contact Theatre Arts Department for details.

College of Natural Resources

Undergraduate Scholarships

The following scholarships and awards are available to undergraduate students *only*. Separate application must be made through the College of Natural Resources; check with the dean's office, Natural Resources 112, for application forms and deadlines.

College of Natural Resources Alumni Association Scholarship. Awarded on the basis of financial need to an undergraduate student in the College of Natural Resources. Special consideration given to nontraditional students.

Joseph Barry Bass Memorial Scholarship. Awarded to an outstanding freshman or sophomore majoring in range science who meets as many of the following criteria as possible: graduated from a high school outside of Utah, active in the USU student chapter of the Society for Range Management, served as a range management employee with a federal land management agency or worked for the federal government in fire control, active in the USU Rodeo Club, a member of Alpha Gamma Rho, and served in the military.

Ray Becraft Scholarship. Awarded to a freshman on the basis of scholarship, need, leadership, and interest in natural resources.

Mark R. Boyer Scholarship. Recipient must be a junior or senior majoring in fisheries and wildlife. The student must demonstrate financial need, personal integrity, and a high sense of social and moral responsibility.

T. W. Box Scholarship. Recipient must be an undergraduate natural resources student who demonstrates financial need, has potential for excellence, and maintains a 3.25 GPA while receiving the scholarship.

Class of '50 Scholarship. This endowment fund for undergraduates was created

and is maintained by contributions from the College of Natural Resources graduating class of 1950. Recipient must enroll for at least 12 credits each semester, earn a 3.0 cumulative GPA, and demonstrate financial need.

T. W. Daniel Scholarship. Awarded to the outstanding junior student in the forestry major as determined by scholastic excellence and contribution to the Forestry Club.

Paul M. and Neva Dunn Scholarship. Recipient must be at the end of his/her junior year in the College of Natural Resources. Selection is based on scholarship and need.

Fisheries and Wildlife Emeritus Faculty Scholarship. Recipient must be a junior or senior registered in Fisheries and Wildlife. Selection is based on academic performance, ethical and moral standing, and financial need.

J. Whitney Floyd Memorial Scholarship. Recipient must be registered in the Forest Resources Department as a junior or senior. Selection is based on academic performance, as well as ethical and moral standing. Student should show some evidence of financial need.

Geography Faculty Scholarships for Academic Excellence. Awarded to an outstanding sophomore, junior, and senior in the Geography and Earth Resources Department.

George E. Hart Scholarship. Recipient should be an undergraduate who demonstrates academic achievement, personal integrity, and a high sense of social responsibility.

William T. Helm Scholarship. Awarded to a junior or senior in the Department of Fisheries and Wildlife. Recipient should be in good academic standing, have demonstrated financial need, and have an interest in fisheries management.

Evelyn Irving Scholarship. Awarded to an upper-division student in the Department of Forest Resources. Selection is based on demonstrated interest in campus or community projects, financial need, and scholastic achievement.

Arthur F. Johnson Scholarship. Awarded annually to a qualifying junior for completion of his/her degree in fisheries and wildlife management. Candidates must have a career interest in the field of fisheries and wildlife and shall present a record of related accomplishments and potential in high school, college, or in field experience. Candidates with the greatest financial need will be given priority.

Samuel E. Jorgensen Scholarship. Awarded to an undergraduate student majoring in fisheries and wildlife.

George A. Judah Scholarship. Awarded to an undergraduate on the basis of GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

George H. and Dorothy Kelker Scholarship. Awarded to a junior or senior natural resources student on the basis of professional promise, academic achievement, and commitment to ethical management of natural resources.

William G. Kohner Scholarship. Awarded to an undergraduate on the basis of financial need and academic achievement.

Timothy Leary Scholarship. Awarded to a junior or senior on the basis of scholarship, leadership, and demonstrated desire to help people. Preference given to students majoring in curricula designed to improve the environment.

Jessop B. Low Scholarship. Awarded to a junior or senior in Fisheries and Wildlife having a demonstrated interest in wildlife management, a record of leadership in extracurricular activities, genuine financial need, and a minimum 3.2 GPA.

John and Karen Malechek Scholarship. Awarded to an undergraduate range science major on the basis of academic achievement and financial need.

Raymond R. Moore Scholarship. Awarded to an upper-division Forestry major on the basis of academic achievement, student activities, and financial need.

Mutual of Omaha Marlin Perkins Scholarship. Awarded to a junior or senior with an interest in wildlife conservation, natural resources management, or environmental education. Selection is based on academic achievement and extracurricular activities demonstrating an interest in these natural resources fields.

Phelps/Ware Scholarship Award. Awarded to an undergraduate student in the Fisheries and Wildlife Department who has demonstrated a commitment to the hunting and fishing aspects of resource management.

Gregory R. Rost Scholarship. Awarded to an undergraduate on the basis of academic achievement, financial need, and personal integrity. Special consideration is given to out-of-state students.

Richard M. Schreyer Scholarship. Awarded to a recreation resource management major who demonstrates academic achievement, financial need, and personal integrity.

Seely-Hinckley Scholarship. Awarded to undergraduates on the basis of academic achievement and financial need. Established as a memorial for John H. Seely and Robert H. Hinckley.

William F. Sigler Scholarship. Awarded on the basis of financial need to a junior or senior in Fisheries and Wildlife. Recipient must be in the top 25 percent of his or her class.

Arthur D. Smith Memorial Scholarship. Awarded to a student in the Rangeland Resources Department on the basis of academic achievement and financial need. Preference is given to a freshman or sophomore who comes from a rural area within the Intermountain region and who is interested in the land management aspect of range science.

Society for Range Management—Laurence A. Stoddart Memorial Scholarship. Awarded by the Utah Section, Society for Range Management, to the outstanding range science sophomore or junior at Utah State University, Brigham Young University, or Southern Utah University. Selection is based on GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

Laurence A. Stoddart Memorial Scholarship. Recipient must be a sophomore or junior student in the Rangeland Resources Department. Scholarship is awarded on the basis of GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

Allen W. and Alice Stokes Scholarship. This undergraduate scholarship is based on need, with special consideration given to nontraditional or ethnic minority students.

Victor N. and Beatrice E. Stokes Scholarship. Awarded on the basis of financial need to an undergraduate forestry or range science major who has a demonstrated interest in land management of range and/or forest resources.

Philip J. Urness Scholarship. Awarded to an upper-division Rangeland Resources undergraduate with an interest in wildlife-livestock interactions or applied rangeland management. Recipient must demonstrate financial need and maintain a minimum 3.0 GPA.

Jeffrey S. Workman Memorial Scholarship. Awarded to a USU undergraduate student in any major on the basis of need and the potential for the award to positively influence the recipient's personal and professional development. Scholarship is to be applied toward FAA-approved private pilot flying lessons.

Graduate Scholarship

The following scholarship is available to graduate students *only*. Application must be made through the College of Natural Resources; check with the dean's office, Natural Resources 112, for application form and deadline.

S. J. and Jessie E. Quinney PhD Fellowships. Awarded to exceptional students beginning a doctoral program in the College of Natural Resources. Recipients must have been accepted into a PhD program, and must be recommended by their major professor and department head.

Undergraduate and Graduate Scholarships

The following scholarships are available to *both* undergraduate and graduate students. Separate application must be made through the College of Natural Resources; check with the dean's office, Natural Resources 112, for application forms and deadlines.

S. J. and Jessie E. Quinney Scholarship. Student must be a high school or transfer student seeking either a first or second bachelor's degree or a Master of Forestry degree. Awarded to students showing high academic performance, leadership, and evidence of promise. Student must be able to communicate effectively and show motivation in some aspect of natural resources. This is determined by a written essay, personal interview, and references.

Gary Smith Scholarship. Awarded to either an undergraduate or graduate student who is involved in desert or canyonland research and has the potential to become a “singer of songs and righter of wrongs.”

College of Science

Undergraduate Scholarships

The following scholarships are available to undergraduate students *only*. Applications are available at the respective departmental office, unless otherwise noted.

Thomas L. Bahler Scholarship. Established in recognition of Thomas Bahler's long-time dedication and support in the Department of Biology, with special emphasis for students preparing for medical school. This award is generally made to a prehealth student with a biology major.

Department of Biology Scholarship. Awarded annually to students with biology majors, this scholarship is contingent upon good performance during the academic career.

John M. Branch Scholarship. A scholarship in memory of John M. Branch (BS Geology 1981). Awarded every other year to an outstanding undergraduate geology major.

Theodore M. Burton Scholarship. Established by the LDS Church to honor Theodore M. Burton, who was a professor of chemistry at USU and a member of the First Quorum of the Seventy. Awarded annually to an outstanding sophomore, junior, or senior with a major in the College of Science. Apply at the College of Science Dean's Office, SER 101.

Christenson Memorial Scholarship. Established to assist deserving undergraduate students majoring in entomology and zoology. The award is based upon scholarship, character, and professional promise. The funds from which the award is made were contributed by the family and friends of L. D. Christenson; the fund is administered by the Department of Biology.

College of Science Scholarship. A four-year tuition plus cash award given to an incoming freshman. Selection is made on the basis of performance on a competitive examination, grade point average, and ACT scores.

Oscar Wood Cooley Scholarship. A scholarship awarded to an outstanding junior or senior majoring in the college. This scholarship is given to honor the memory of Oscar Wood Cooley. Apply at the College of Science Dean's Office, SER 101.

Joe and Carletta Elich Scholarship. Annual cash awards to outstanding students majoring in mathematics, mathematics education, or statistics.

Sharon Lee Gardner Ellis Memorial Scholarship. Annual cash award given in memory of Sharon Lee Gardner Ellis, who was an outstanding mathematics teacher in the public schools. Awarded to a student majoring in mathematics education who has the potential to challenge, inspire, and teach young mathematics students.

George H. and Billie Bush Emert Scholarship. A $300 cash award given to a biochemistry student. Provided by George Emert, Utah State University president, and his wife Billie. Recipients must demonstrate academic achievement, financial need, and personal integrity. Candidates chosen by the scholarship selection committee of the Department of Chemistry and Biochemistry. Recipients of awards from this fund shall be known as Emert Scholars.

First Security Foundation Scholarship. Cash award made annually to an outstanding undergraduate computer science student.

Eldon J. Gardner Research Award. Awarded to an undergraduate biology student to assist in genetic research.

Get Away Special (GAS) Scholarship. High school seniors with an interest in space research are eligible to apply for a GAS scholarship. The scholarship is a full in-state tuition waiver and, provided the student's USU GPA remains at or above 3.5, is good for 8 academic semesters. Under certain conditions, the scholarship can be a full out-of-state tuition waiver. Through this scholarship program, the student is provided with the facilities and resources to build his or her own experiment for flight on the NASA Space Shuttle. Information can be obtained from the GAS Program Faculty Adviser, Physics Department, Utah State University, 4415 Old Main Hill, Logan UT 84322-4415.

Greaves Memorial Scholarship. Cash award in memory of Drs. Joseph and Ethelyn O. Greaves for students who have achieved in the field of science. Apply at the College of Science Dean's Office, SER 101.

Clyde T. Hardy Scholarship. A scholarship in honor of Clyde T. Hardy, professor emeritus and second Geology department head. Awarded every other year to an outstanding undergraduate geology major in support of geology field camp.

Neville C. and Annie P. Hunsaker Scholarship Award. Awarded to high school seniors going to USU and majoring in mathematics or statistics, or to USU students enrolled in the Department of Mathematics and Statistics. Generally four-year awards carrying cash payments for the first two years, with some additional support provided through special work opportunities during the last two years.

INEFL Scholarship. A three-year tuition and fees scholarship awarded annually to an outstanding freshman computer science student.

Garth L. Lee Undergraduate Scholarship Award. Four awards are given annually in honor of Garth L. Lee, former professor of chemistry at Utah State University, to a student in each year of study who demonstrates outstanding command of chemical science. The award consists of a $300 account for purchase of books/supplies at the Utah State University Bookstore and a one-semester in-state tuition waiver, and for the senior recipient a $300 cash award.

Maeser-Bauer Undergraduate Scholarship Award. A $200 cash award, given primarily for high scholastic achievement. Presented to an outstanding junior or senior chemistry major who has completed the physical chemistry series. Established in memory of Drs. Sherwin Maeser and Norman Bauer, former faculty members in the Department of Chemistry and Biochemistry.

Mathematics and Statistics Scholarship. Supported by donations to the Math Endowment Account, these annual cash awards are given to outstanding students majoring in mathematics or statistics.

Lawrence R. and Abelina MeGill Scholarships. Scholarships established by Lawrence R. and Abelina MeGill for students in Physics or Electrical and Computer Engineering. At least 50 percent of the recipients each year shall be female and/or members of an ethnic minority.

Physics Undergraduate Scholarships. Awarded annually to undergraduate physics majors based on scholarly achievement, character, and professional promise.

Wendell L. Pope Scholarship. Cash award given annually to an outstanding undergraduate computer science student.

David Rider Memorial Scholarship. Given in memory of David Rider (BS Geology 1954). Awarded every year to an outstanding junior or senior geology major. Selection based on academic achievement and financial need.

Thomas A. Riemondy Scholarship. A scholarship in memory of Thomas A. Riemondy, a deceased USU undergraduate Geology major. Awarded annually to an outstanding undergraduate Geology major who is not a resident of Utah.

Seely-Hinckley Scholarship. A scholarship established as a memorial for John H. Seely and Robert Hinckley. Awards are based on superior performance and financial need. Apply at College of Science Dean's Office, SER 101.

Richard J. and Marion A. Shaw Scholarship. Established as an endowment fund for the benefit of future generations of students who demonstrate high academic achievement, superior potential, and personal integrity. Awarded to students majoring in biology with an emphasis in plant biology.

John R. Simmons Scholarship. Established to recognize the service given by John R. Simmons, former department head and faculty member in the Department of Biology. Available to junior or senior students majoring in biology and showing scholastic achievement, personal integrity, and financial need.

Space Science Scholarship. A four-year scholarship for students interested in a career in space science (physics). A tuition-free scholarship the first year with subsequent years contingent upon good performance. During their academic career, students will possibly have opportunity to work with appropriate faculty members in space science and earn some subsistence. They will also develop an experimental payload to be flown on the space shuttle.

Harris O. and Eleanor Y. Van Orden Endowed Scholarship Award. Recipient must be an undergraduate chemistry major with a high academic record. The award consists of a $300 cash stipend.

O. Harry Otteson Scholarship. Annual award given in memory of Professor Harry Otteson to the physics major achieving the highest score in general physics.

Graduate Scholarships

The following scholarships are available to graduate students *only*. Applications are available at the specific departments mentioned.

Gene Adams Scholarship. In memory of Gene Adams, former professor of physics, this scholarship is awarded annually to a graduate student in physics who demonstrates academic performance, financial need, and personal integrity.

Chemistry and Biochemistry Alumni Award. A $200 cash award, provided by alumni funds, for an outstanding graduate student majoring in chemistry. Usually given to a student who will finish his or her degree within a year.

Thomas F. Emery Research Scholar Memorial Award in Biochemistry. A cash award, presented in memory of Dr. Thomas F. Emery, a highly respected biochemist who served for many years in the Department of Chemistry and Biochemistry. Given to a graduate student prior to his or her final year. Recipients must demonstrate academic achievement, financial need, and personal integrity, and shall be known as Thomas F. Emery Research Scholars.

Marjorie H. Gardner Teaching Award. A $200 cash award, given in memory of Dr. Marjorie H. Gardner, a pioneer and distinguished leader in chemical education and science. Presented to honor an outstanding teaching assistant and to emphasize

the commitment to excellence held by the faculty of the Department of Chemistry and Biochemistry.

Delbert A. Greenwood Memorial Award in Biochemistry. A $200 cash award, given in memory of Dr. Delbert A. Greenwood, to an outstanding graduate student majoring in biochemistry. Usually given to a student who will finish his or her degree within a year.

Datus M. Hammond Memorial Scholarship. Awarded in memory of the late department head, Datus M. Hammond, to students majoring in biology. Based upon scholarship, character, and professional promise, the award is generally made to a graduate student in biology.

Maeser-Bauer Graduate Teaching Assistant Awards. In memory of Drs. Sherwin Maeser and Norman Bauer, two $200 awards are given annually upon recommendation of the Department of Chemistry and Biochemistry to outstanding graduate teaching assistants in good standing in the department.

J. Stewart Williams Graduate Fellowship. A fellowship in memory of J. S. Williams, first Geology Department head and first dean of the School of Graduate Studies. Awarded annually to Geology graduate students for thesis research.

Undergraduate and Graduate Scholarship

The following scholarship is available to *both* undergraduate and graduate students. Application is available at the Physics Department.

James E. Brown Scholarship. A scholarship in space sciences, space engineering, and aerospace corporation administration to be awarded to a graduate or undergraduate student with high academic standards majoring in some aspect of space sciences, space engineering, or aerospace administration.

Athletics

Scholarships

Information about any athletic scholarship is available at the Athletic Office. For more details, contact the office at (435) 797-1850 or write to: Athletic Office, Utah State University, 7400 Old Main Hill, Logan UT 84322-7400.

Awards and Honors

Alpha Lambda Delta Award to Senior Students. Book Award. An award to a senior who has been an Alpha Lambda Delta member and who carries the highest grade point during four years of college.

Alpha Zeta Award. An award is made annually by Alpha Zeta fraternity honor society of agriculture students to the sophomore in agriculture who made the highest scholastic record in the freshman year.

The American Institute of Chemists Foundation Undergraduate Award. The award is to honor a senior student in recognition of a demonstrated record of leadership, ability, character, and scholastic achievement. The award consists of a calligraphed certificate and a one-year free Student Associate membership in AIC.

The American Legion Military Medal. A gift of the Logan American Legion Post, it is awarded each year to the athletic letterman who maintains the highest scholastic record during the year and who exhibits the most wholesome attitude toward military training.

American Society for Horticulture Science Award. A plaque will be presented to the outstanding senior in horticulture.

American Society of Agronomy Award. A plaque will be presented to the outstanding senior in agronomy.

American Society of Animal Science Undergraduate Scholarship Awards. Certificates and medals awarded annually to sophomores, juniors, and seniors majoring in Animal Science who are in the top 10 percent of their class.

American Society of Civil Engineering Associate Memberships. Awarded annually to senior engineering students on the basis of scholarship, promise of success in engineering, personality, and ASCE student chapter activity. The awards consist of associate membership in the American Society of Civil Engineers. The first is given by the Intermountain Section of ASCE, the second by the Civil Engineering faculty, and the third by the student chapter of ASCE.

ASCE Membership Award. Junior membership in the American Society of Civil Engineers is awarded by the Intermountain Section, ASCE, to a graduating senior in civil engineering on the basis of scholarship, activities, and personality. Selection is made by the engineering faculty.

ASCE Student Chapter Award. Junior membership in ASCE to the senior doing most for the chapter. Selected by vote of members.

ASLA Merit and Honor Awards. The Utah Chapter of the American Society of Landscape Architects, in conjunction with the faculty of the Department of Landscape Architecture and Environmental Planning, present four awards to graduating seniors and graduate students annually. Candidates are judged on scholarship, professional experience, and the professional quality of their academic work.

Laura B. Aspaas Memorial Award. Cash award to an outstanding student in the Geography and Earth Resources Department.

The Barnes Key. Rey and Marjorie Barnes award a key annually to an undergraduate student who is affiliated with the campus radio or television station. The student must have a cumulative grade point average of 2.5 or above, must have carried at least one radio class during the year of the award, and must have demonstrated a deep interest in furthering radio and television arts at Utah State University. Selection shall be made by the director of radio and television at USU, the person directly responsible for the campus radio station, and Rey L. Barnes.

Blue Key Award. Each year Blue Key Honorary Service Fraternity awards a "Service Plaque" to an outstanding freshman or sophomore male student. Candidates are judged on University activities, scholarship, service to the University, and moral character. Application forms can be obtained from the organization and must be filed with the Blue Key Awards Committee on or before April 15.

Business Education Student Teacher Award. Presented to one or more senior student teachers who have exemplified superior ability in their student teaching experience.

Cache Valley Chapter of the Utah State Historical Society Award. The Cache Valley Historical Society offers annually an award of $25 to the USU student writing the best acceptable treatise on any phase or field of Cache Valley history. Papers must be submitted on or before the end of the spring semester and become the property of the Cache Valley Historical Society.

College of Natural Resources Outstanding Senior Award. Awarded to a graduating senior in the College of Natural Resources who has maintained a high record of academic achievement, professional involvement, and community activities.

Freshman Chemistry Handbook Awards. A copy of the *Handbook of Chemistry and Physics* is presented to the students with the best scholarship record in the Principles of Chemistry courses for science majors.

Chi Omega Sorority Award. An award of $25 is given annually to the female student majoring or minoring in social sciences who gives evidence of superior scholarship and ability to make a contribution to organized group life. The committee of awards is appointed by Chi Omega Sorority each year from the teaching staffs of the Sociology and Economics Departments.

Civil Engineering Faculty Award. Junior membership in the ASCE or ASAE is awarded by the engineering faculty to a graduating senior in engineering on the basis of scholarship and promise of success in engineering. Selection is made by the engineering faculty.

Virginia Dare Award. A cash award of $25 to the outstanding junior in dairy manufacturing.

Delta Beta Chi Award. Ten dollars is awarded annually by the Delta Beta Chi Chemistry Fraternity to the freshman or sophomore chemistry student who writes the best essay on some subject of chemistry.

Distinguished Service Awards. Awards are given annually to outstanding students in theatre, music, library, and physical education.

Division of Analytical Chemistry American Chemical Society Award. The Division of Analytical Chemistry of the American Chemical Society provides an award, which consists of a fifteen month subscription to the *Journal of Analytical Chemistry* and honorary membership in the Division of Analytical Chemistry to an outstanding undergraduate student who displays an aptitude for a career in analytical chemistry. The awardee must have completed his or her third undergraduate year and be enrolled as a senior during the coming academic year.

Foreign Student Achievement Award. A certificate of achievement to a graduating foreign student from a non-English speaking country who has the highest scholastic average during undergraduate study.

Institute of Electrical and Electronic Engineers Outstanding Senior. A certificate given annually to a member of the local student chapter of IEEE.

Institute of Electrical and Electronic Engineers Paper Contest. A noncash award (e.g. a calculator) given to the winner of the annual technical paper contest.

LAEP Faculty Medal. The Faculty Medal is awarded annually to a senior or graduate student in the Department of Landscape Architecture and Environmental

Planning. The medal is given to the outstanding student in the department based upon the judgement of the faculty. The award takes into account the academic record of the individual, their contribution to the department and the profession during their period of education, and, most importantly, their future potential contribution to the profession in practice.

Logan Kiwanis Club Trophies. Each year, the dean of each of the eight colleges selects an outstanding student in the college to receive the Kiwanis Club Plaque.

Virginia Jenkins Award. An award given to a male junior or senior student who has completed a mission for the LDS church. Contact Financial Aid Office for details.

Mechanical and Aerospace Engineers Faculty Award. An engineering handbook awarded annually to the mechanical or aerospace engineering senior with the highest grade point average. The award is made by the Mechanical and Aerospace Engineering Department faculty.

National Business Education Association Award. An award presented by the National Association for Business Teacher Education to the senior who has distinguished himself or herself in business education.

National Council for Geographic Education Award. An award given annually by the National Council for Geographic Education to recognize academic achievement by a graduating senior in geography education.

Outstanding Seniors in the College of Engineering. A plaque and a cash award given annually to the outstanding senior in each of the departments in the College of Engineering: Biological and Irrigation Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, Industrial Technology and Education, and Mechanical and Aerospace Engineering.

Outstanding Senior in the College of Engineering. A plaque and a cash award given annually at the Engineering Banquet to the outstanding senior in the college.

Outstanding Seniors in the College of Family Life. A plaque and cash award given annually at the Family Life Scholarship Banquet to the outstanding senior from each of the departments: Family and Human Development, Human Environments, and Nutrition and Food Sciences.

Outstanding Seniors in the College of Natural Resources. Annual awards given to one senior in each department of the college—Rangeland Resources, Forest Resources, Fisheries and Wildlife, Geography and Earth Resources, and the Watershed Science Unit. Based on academic achievement, professional commitment, and demonstration of leadership in academic and extracurricular activities. Selected by faculty in respective departments.

Outstanding Graduating Senior in the Department of Chemistry and Biochemistry. A $100 cash award to the graduating senior who has made the most significant contributions to department programs and activities.

Drs. Myron D. and Ann Rice Award for Superior Performance in Business or Marketing Education. A $300 award for a student majoring in Business Education or Marketing Education who has exhibited superior performance in his or her field.

The ROTC Medal. A gift of the institution is awarded each year to the student in military science and tactics who most nearly represents the ideal that the Reserve Officers' Training Corps is striving to develop, upon the following basis: (a) character, 20 points; (b) scholarship, 15 points; (c) University activity, 15 points; (d) leadership, 20 points; (e) aptitude for and interest in Military Science, 20 points; (f) physique and bearing, 10 points.

Scholarship A's. In the form of a pin, these awards are given to undergraduate students who present evidence that their grades are all “A's” for two consecutive semesters of their residence. At least 15 credits must be graded courses. Contact the Enrollment Services Office for details.

Sigma Lambda Alpha Awards. Sigma Lambda Alpha is the National Honor Society in Landscape Architecture. Invitations and awards are made each year to outstanding upper-division and graduate students in the Department of Landscape Architecture and Environmental Planning. Awards are recommended by the faculty based on the scholastic records of the individual. The minimum grade point average for invitation is 3.2 or above.

Sigma Tau Award. To the outstanding sophomore engineering student for scholarship, sociability, and practicability. Selection made by the Alpha Delta Chapter of Sigma Tau, an honorary engineering fraternity.

Society of American Foresters Outstanding Senior Award. Award given by the Wasatch Front Chapter of the SAF to a student who has achieved academic excellence and who has been active in professional activities and the USU Student Chapter of the SAF.

Utah Association of Certified Public Accountants. An award for the purpose of stimulating interest, to the outstanding senior student majoring in accounting.

Utah State Historical Society Award. An award to the outstanding graduate majoring in history.

Utah State University Business Education Student Teacher Award. This honorary award is presented to one or more senior student teachers who have exemplified superior ability and excellence in completing their student teaching experience leading to the BS degree.

***Wall Street Journal* Award in Business.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in accounting.

***Wall Street Journal* Award in Business.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in business administration.

***Wall Street Journal* Award in Business.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in management and human resources.

***Wall Street Journal* Award in Economics.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in economics.

Colonel Joe E. Whitesides Award. This award is given to the outstanding student athlete selected by the Athletic Council on the basis of (1) academic achievement, (2) athletic achievement, and (3) adjustment to meet the daily demands in character, social, and general culture.

Loans

The A Men's Athletic Association Loan Fund. Monies to be used for tuition and books by the direct descendants of A Men members. The A Men Association consists of individuals who received the athletic award A from USU prior to 1970. Monies must be repaid within 24 months after borrowing. For details, contact Director of Financial Aid.

James W. and Margaret E. Bingham Student Loan Fund. Senior students have priority to this loan fund, then junior students may borrow. The loans are to be repaid within a one-year period after the students graduate. Contact the Financial Aid Office for details.

The Edgar B. and Laura Cowley Brossard Loan Fund. An emergency loan account for needy junior and senior students given by the Brossards, alumni of Utah State University. Apply for these funds as an emergency loan through the Financial Aid Office.

Box Elder High School Loan Fund. For USU students who have attended Box Elder High School.

East Carbon Wildlife Federation Loan Fund. Provides up to $300 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details, contact the dean's office, College of Natural Resources.

Orson A. and Rae N. Christensen Loan Fund. From a generous gift of the Christensens, a loan fund at a low interest rate is set up to help students through school. The accrued interest goes to create scholarships in the College of Business. Apply for these funds as an emergency loan through the Financial Aid Office.

J. Reuben Clark Small Loan Fund. A reserve specifically provided for assistance to students in meeting school obligations.

Annie Givens Anderson Gardner Loan Fund. This loan is for needy freshman women with no previous college training who are members of the Church of Jesus Christ of Latter-day Saints in good standing. Apply for these funds as an emergency loan through the Financial Aid Office.

Edwin and Josephine Gossner, Sr. Cooperative Education Student Loan Fund. For students attending USU; 30 percent of the fund is reserved for native American students. The loans are to be repaid within a six-month period. Contact the Director of Cooperative Education for details.

Intercollegiate Knight Loan Fund. Loan fund provided by the Intercollegiate Knights for needy USU students.

O. W. Israelsen Memorial Loan Fund. Upper-division or graduate students in irrigation and drainage engineering may use this fund.

Robert L. Judd Loan Fund. This loan fund was given by Mrs. Judd in honor of

her late husband. Loans are available to undergraduate men who have ability and need financial assistance. Apply for these funds as an emergency loan through the Financial Aid Office.

Editha Smith Kent Loan Fund. Dr. Melvin Kent gave this generous gift to be used as a loan fund in honor of his wife, Editha Smith Kent. The Kents are both USU alumni. The fund is used to provide student loans at a low interest rate. Apply for these funds as an emergency loan through the Financial Aid Office.

Henry Lane Memorial Fund. Established by his sons, Sid and MacArthur Lane, in memory of their father. This loan fund is to be used by black varsity athletes.

Vera Nielson Langford Loan Fund. From a generous gift, a loan fund to be used by needy home economics students.

Latin American Student Loan Fund.

Larue H. Merrill and Ida K. Merrill Loan Fund. An emergency loan fund for senior students given by the Merrills, alumni of USU. Monies are to be repaid within a maximum of 12 months after graduation. Contact Financial Aid Office for details. Apply for these funds as an emergency loan through the Financial Aid Office.

George A. Meyers Loan Fund. Established in memory of Dr. Meyers, a friend and benefactor of foreign students, for their emergency needs. Apply for these funds as an emergency loan through the Financial Aid Office.

Edgar B. and Laprile B. Mitchell Loan Fund. This loan fund was established for students who are in need of financial assistance to commence or continue their education at Utah State University. The loan shall be made only for undergraduate students. Apply for these funds as an emergency loan through the Financial Aid Office.

Marjorie Paulsen Loan Fund. A fund provided by the father of a former Aggie student active in student body affairs.

Arthur Pirsko Loan Fund. Provides up to $300 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details, contact the dean's office, College of Natural Resources.

W. B. Rice Memorial Loan Fund. This loan fund provides loans up to $300, usually for one year, to deserving students in the College of Natural Resources. Application is made to the dean's office.

Senior Loan Fund. A gift of the class of 1911, and added to by the class of 1922, has helped many students complete school.

Margaret Sigler Loan Fund. A short-term loan of $100 to be repaid by the student in a specified time period with no interest charges. Contact Women's Center/Reentry Student Center.

H. Grant Stephens Loan Fund. A special borrowing fund with minimum interest rates to be used with pressing financial needs. Given in honor of Mr. Stephens by his children. Apply for these funds as an emergency loan through the Financial Aid Office.

Lewis M. Turner Loan Fund. Provides up to $300 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details, contact the dean's office, College of Natural Resources.

Ichel Water Loan Fund. An individual gift to assist students in need.

National Honor Societies with Chapters at USU

Golden Key

Founded at Georgia State University in 1977, this academic honors organization recognizes and encourages scholastic achievement among students from all academic fields. The society unites talented undergraduate students with prominent faculty members and administrators who are active in Golden Key at the chapter and national levels. Two scholarships are awarded annually by each chapter to outstanding junior and senior initiates.

Membership, by invitation only, is limited to no more than the top 15 percent of juniors and seniors enrolled at USU. Part-time and full-time students qualify, as do traditional and nontraditional students.

Chapter Adviser: Alta L. Markeson, Assistant Director, Partners in Business, College of Business; Business 309, (435) 797-3815.

Phi Kappa Phi

Phi Kappa Phi is a national honor society, founded in 1897 to recognize and encourage superior scholarship in all academic disciplines. Membership is based upon academic achievement and is proffered to undergraduate and graduate students who obtain a grade point average in the highest 10 percent of those graduating from each college at USU. The national organization awards 50 graduate school fellowships each year to outstanding students from throughout the country.

Chapter Adviser: Maureen Wagner, president (academic services adviser, College of Natural Resources), (435) 797-2448.

Pinnacle

Pinnacle is a national honor society for undergraduate or graduate reentry students. Initiates must be 25 years of age or older, must have had at least a five-year gap at some point in their education, must have at least a 3.0 overall GPA at USU, and must be involved in campus and/or community activities. Membership is open to juniors, seniors, and graduate students.

Chapter Adviser: Janet L. Osborne, director, Women's Center/Reentry Student Center, (435) 797-1728.

Mortar Board

The Sigma Phi Eta chapter of Mortar Board has existed at USU since 1970. It was founded in 1918 as the first national organization honoring senior college women. Mortar Board opened its membership to men in 1975.

Mortar Board recognizes college seniors for distinguished abilities in scholarship, leadership, and service. Members continue to magnify these traits throughout membership by developing and carrying out activities, events, and service projects. New members are chosen during spring semester and must be in the top 35 percent of their class.

Chapter Adviser: Travis Morgan, assistant director, Student Activities, (435) 797-1740.

Special Programs and Centers

Study Abroad Program

The USU Study Abroad Program, directed by Joy Lall, offers many exciting and rewarding opportunities for students to study abroad.

Each summer semester, the Languages and Philosophy Department offers opportunities for language and culture studies abroad. Groups travel to Segovia in Spain, Annecy in France, and Freiburg, Germany. A tour to Russia, led by knowledgeable Russian-speaking language professors, takes place each June.

USU also offers many student exchange opportunities. Through the International Student Exchange Program, a consortium of more than 200 universities, it is possible for students to study in Africa, Asia, Australia, Canada, Europe, Latin America, or Oceania. In addition to the ISEP program, USU offers exchange programs at several other universities. Students may take Spanish language classes, as well as coursework taught in either Spanish or English, at ITESM University in Mexico and in Costa Rica. The University of North London also offers a wide variety of subjects, with students housed near historic Hyde Park. At Kansai Gaidai and Gifu universities in Japan, all levels of Japanese are taught. Students may also earn credits in subjects taught in English at Kansai Gaidai. Keimyung University in Korea provides classes taught in English and intensive Korean. Students fluent in Chinese may study at China's prestigious Beijing University. College of Business students can participate in programs in Western Sydney, Australia and Bristol, England.

For additional information, contact the Study Abroad Office, Student Center 304C, (435) 797-1253 or (435) 797-0601.

Exchange Programs

Utah State University participates in several student exchange programs, including Cultural Exchange, National Student Exchange (NSE), and International Student Exchange (ISEP).

Cultural Exchange

Cultural exchange opportunities are available to USU students, both in the credit and noncredit mode. The programs include summer study programs in Spain, Germany, and France; and an annual travel-study tour to Russia. Further information can be obtained from the Department of Languages and Philosophy, Utah State University, 0720 Old Main Hill, Logan UT 84322-0720, telephone (435) 797-1209.

National Student Exchange

National Student Exchange (NSE) is a group of over 130 colleges and universities in the United States. NSE is designed to: (1) provide students with options for educational travel and study at minimal cost, (2) provide educational opportunities in academic studies not available at USU, and (3) create an appreciation of diverse ideas and value systems.

Students normally participate in NSE during their sophomore or junior year. For further information, contact LaVell Saunders, Student Center 302, (435) 797-1132.

International Student Exchange Program

Through the International Student Exchange Program (ISEP) students can study in Africa, Asia, Australia, Canada, Europe, Latin America, or Oceania. ISEP offers traditional European study abroad opportunities at some of the leading institutions in Austria, France, Belgium, Germany, Hungary, and the United Kingdom. Exciting new opportunities for study in such countries as Estonia, Iceland, Fiji, Ghana, Japan, and Togo are also offered.

ISEP participants matriculate directly into a host institution abroad. Direct matriculation means that participants register as regular students at their host institution, take the same courses, have the same assignments, and participate in the same activities as all other students at that institution.

For more information about ISEP, contact the Study Abroad Office, Student Center 304, (435) 797-0601 or (435) 797-1253.

Disability Resource Center

The purpose of the Disability Resource Center is to help students with disabilities overcome physical, educational, or attitudinal barriers which may prevent them from reaching their full educational potential. Staff members coordinate University support services, thus aiding students in becoming integrated into the campus community.

The Disability Resource Center is located in Room 104 of the Taggart Student Center and can be reached by telephone by calling (435) 797-2444 voice/TDD.

Services offered by the Disability Resource Center include:

1. Campus orientation, architectural access, and modification. Accessibility map is available.

2. Registration assistance, including interpreters, advisers, and escorts.

3. Equipment loan and Assistive Technology Laboratory, including FM amplification systems, tape recorders, aids for the visually impaired, and adapted computer hardware and software.

4. Referral information regarding campus and community services, including a referral registry for nonacademic interpreters, readers, personal care attendants, and escorts.

5. Taped textbooks, provided by volunteers recruited and trained by the Disability Resource Center, in cooperation with the Utah State Library for the Blind and Physically Disabled. Kurzweil Reading Machine and CCTV enlarging devices are available.

6. Counseling for academic and personal needs.

7. Support service coordination with the Division of Vocational Rehabilitation for resident and nonresident students.

8. Assistive Technology Laboratory includes computers, adapted input devices, voice synthesizers, closed captioned decoders, scanners, and enlarged output devices.

Academic Resource Center

Director: Noelle A. Call
Office in Student Center 302, (435) 797-1132

The Academic Resource Center provides services and programs for undergraduate students to enhance their learning skills and strategies and to facilitate their academic succeess. The Division of General Registration provides services to underprepared students who have not yet met criteria for admission to their declared major. The center provides individual academic advising, classes, tutoring, supplemental instruction, workshops, individual instruction, and print, video, and computer-based instructional materials.

Courses

Psy 1730, Strategies for Academic Success (1-3 credits), involves discussion and application of important study strategies for college success. It is designed for any student interested in developing and improving study skills. Topics of discussion include: developing and achieving goals and objectives; use of campus resources; time scheduling and management; memory improvement; notetaking; motivation; textbook, reading, and studying skills; test taking; oral and written communication; and development of strategies which lead to academic success.

Psy 1750, Comprehension Strategies for College Reading (1 credit), is designed for students who want to improve their college reading skills in the areas of comprehension, vocabulary, and retention of information. New strategies are learned by applying and practicing the skills in college textbooks from the student's other classes.

MHR 2160, Student Applied Leadership Training (1-3 credits), is designed to develop the skills of students interested in being tutors. This class meets the standards of the National Tutoring Certification Program.

Workshops

Workshops are offered on a variety of study and self-management skills topics for student groups and classes. Topics include: time management, test taking, test anxiety, and notetaking. To arrange for a workshop, call (435) 797-1128.

Supplemental Instruction

A program of Supplemental Instruction (SI) for University Studies (General Education) courses is sponsored by the center. A student who has successfully completed a University Studies class is hired by the center to attend all class sessions and conduct review sessions. This student exemplifies good study habits and helps students in the SI program to develop study strategies geared at enhancing academic achievement in that class. SI classes and schedules are published each semester on the web (http://www.usu.edu/~acaserv/center/tutoring/si.htm).

Tutoring Programs

Drop-In Tutoring. Free drop-in tutoring is provided by trained tutors for math through the 2000 level, writing skills, and selected science courses. Services are available at the center and other campus sites. Schedules can be picked up in SC 302 each semester.

Tutor Advertiser. Students can hire a qualified tutor through the *Tutor Advertiser*, which is maintained by the center. These tutors are screened by the center and must be paid by the student receiving the tutoring.

Tutor Directory. The center publishes a directory of all on-campus free tutoring. The directory is available in SC 302 and through the center's web page: (http://www.usu.edu/~acaserv/center/frames/lcframes.html).

Study Skills Assessment

A Survey of Reading and Study Efficiency (SRSE II) is offered by the center. Students complete a 65-item questionnaire regarding their current study skills practices. Results are compiled into a personal analysis of the student's strengths and problems across 16 areas. Recommendations are included that direct students to campus resources for assistance. There is a fee of $2.00 for this service.

Idea Sheets

Free Idea Sheets on a variety of study and self-management skills topics are available in the center and through the center's web page (www.usu.esu/~acaserv/center/frames/lcframes.html). These include tips on time management/procrastination, note-taking, memory development, study reading, test taking, assertiveness, self-esteem, handling criticism, etc.

Individual Assistance

Students seeking individual assistance with their study skills may drop in or make an appointment by calling (435) 797-1128.

Video Viewing Library

The center has a collection of videos relating to effective study strategies. Students may view these videos in the center.

Referral Resources

The center provides students with referral information for a variety of on-campus and off-campus services and agencies.

General Registration

Associate Director of Academic Resource Center: J. Rodney Clark
Office in Student Center 302, (435) 797-3373

General Registration, a component of the Academic Resource Center, is the administrative-academic unit maintained at USU for the enrollment of students who do not meet the admissions requirements of the eight academic colleges.

The primary function of the office is to assist and encourage students in the improvement of their academic status, so they may transfer to the major of their choice. To accomplish this purpose, participants are urged to limit their course loads each semester, satisfy remedial requirements when indicated, and meet frequently with an adviser or the associate director. Students in General Registration are encouraged to take University Studies (General Education) and exploratory classes and not begin taking departmental major programs until they have been admitted to a department, though they may take some lower-division survey courses in their intended major. In addition to the staff in the Academic Resource Center, the resources of the University Counseling Center, Testing Center, and Career Services are available to assist such students with career, aptitude, life skills, and study skills counseling.

The Low Scholarship and Probation Policies of the University

apply to students enrolled in General Registration. When a student has satisfied remedial course requirements and has demonstrated ability to maintain a 2.0 GPA, that student may apply for admission to an academic college and department through the associate director. Regular college admissions evaluations procedures will then be made, and if there are no admissions restrictions, the student will be enrolled in the department of his or her choice.

Cooperative Education Internship Program

The Cooperative Education Internship Program offers both undergraduate and graduate students a unique opportunity to integrate career, social, and personal development into the educational process. The program is designed to allow students to alternate classroom study with a series of paid preprofessional work experiences related to their field of study. These experiences increase in complexity as the student's background in a given field increases.

The program offers several specific benefits to students. It provides those students who have decided on an academic major an opportunity to obtain pregraduation work experience in their chosen career. The program provides those students who are unsure of their academic major an opportunity to explore several career possibilities. It provides them a chance to earn money for their education and credit toward their degree. Finally, it substantially improves the students' opportunities for employment after graduation.

The Cooperative Education Internship Program option is available in all departments on the Utah State University campus. Generally speaking, students begin their work experiences in their sophomore or junior year, although seniors can take advantage of program benefits. Students can undertake either part- or full-time work experiences. Work experiences are available both during the academic year and during the summer. These work experiences may be with a single employer or with different employers; increasing complexity is the critical principle. Salaries vary with the field of work and the complexity of the job.

The amount of academic credit awarded for a given work experience varies, and depends upon the amount of work completed and upon the career-related nature of the experience. The decision regarding credit and the amount to be granted rests with the academic department, and specifically the faculty co-op coordinators. Students must make the credit arrangement with their faculty co-op coordinators prior to their work experience.

Students interested in entering or learning more about the program should contact their academic department or visit the Cooperative Education Internship Program Office, which is located in University Inn 102, or call (435) 797-3588.

Air Force Reserve Officers Training Course

Curricula in Aerospace Studies is divided into **General Military** and **Professional Officer** courses. The first two years total 12 credits. Up to 28 credits are given for the Air Force Professional Officer courses. Enrollment in the General Military Course is voluntary and incurs no military obligation. The Air Force Professional Officer Course incurs an active duty obligation for those students who are under contract.

The Air Force offers an attractive career and benefits package. Qualified cadets may apply for several Air Force sponsored scholarships that pay all tuition, a book allowance, plus a monthly stipend. Upon graduation, the student is commissioned as a Second Lieutenant.

There are sufficient elective credits within most degrees offered by the University for a student to apply a maximum of 40 Aerospace Studies credits toward a degree.

Students should consult their adviser to determine which AFROTC credits can be applied toward a specific degree. For detailed AFROTC requirements and course information, see the Department of Aerospace Studies section of this catalog.

An academic minor is available in Aerospace Studies. Interested students should check with the Aerospace Studies Department for details.

Student Wellness Center

Director: JoAnn R. Autry
Office in University Inn 127, (435) 797-1010

The Student Wellness Center is dedicated to serving students, staff, and faculty by teaching, promoting, and modeling healthy lifestyles. Wellness is encouraged through balance in six major areas: spiritual, physical, intellectual, cultural, emotional, and social. The Student Wellness Center staff is also able to work individually with students to determine the role that alcohol and drugs are playing in their life, as well as the impact of misuse. The Student Wellness Center also offers the following services to students, staff, and faculty:

1. Educational programs for judicially mandated, self-referred, or any interested student, staff member, or faculty member. Alcohol, tobacco, and other drugs; issues concerning children of alcoholics; and women's issues are discussed in the classes.

2. Referral to the proper agency when the required help is not available on campus.

3. Presentations to all student organizations, including fraternities, sororities, residence halls, athletic teams, and campus-based student clubs. These presentations, which are excellent supplements to academic course material, can be scheduled by faculty members for inclusion in their classes. Possible topics include: healthy lifestyles; HIV, AIDS, and STD's; alcohol, tobacco, and drugs; and nutrition.

4. Student involvement in teams offering prevention activities and promoting healthy lifestyles. Also available is training in how to talk to someone with a substance abuse problem. Leadership opportunities for students are abundant.

5. Prevention programs such as National Alcohol and Drug Awareness Week, National Drunk and Drugged Drivers Week, National Safe Spring and Summer Breaks, National Ribbon Week, Health and Wellness Fair, AIDS Awareness Month, and Great American Smokeout.

6. Research and surveys to aid in prevention efforts and compare USU with local and national norms.

7. A library of up-to-date information on substance abuse and health issues. Anyone interested may check out materials from the library.

Housing Services

Campus Housing

Whether residents are freshmen or graduate students, married or single, USU Housing Services has accomodations to meet their specific needs and style of living. USU's commitment is to provide students with high-quality facilities, reasonable prices, excellent customer service, and the ultimate in campus convenience. A well-trained staff in each residential area provides numerous opportunities for social interaction and community building within the halls and apartments. Educational workshops, which supplement formal classroom experiences and learning, are also offered. When it's time for homework, students can access the Internet with their own computer in their apartment, or use computers in one of the housing computer labs, all of which are linked to the Internet via the University's high-speed telecommunications network. The basic types of campus housing are described below. For more information, call 1-800-863-1065 or access the campus housing web site at http://www.usu.edu/~housing.

Traditional-style Living. For those wanting to live at the center of campus and maximize the time spent studying and enjoying the University experience, traditional-style accommodations are the perfect choice. To enhance this lifestyle, all the common-area cleaning, grocery shopping, cooking, and dishwashing are provided with the accompanying dining plan. Students may then concentrate on obtaining an education. Students may choose a private room or share one with a roommate. Traditional-style halls have historically been the most prevalent housing option available on college campuses.

Apartment-style Living. Those wanting the convenience of living on campus, combined with the close-knit atmosphere of a singles apartment, will find their ideal home in the apartment-style residence halls. A unit consists of three two-person bedrooms, a living room, a full kitchen, and bathroom(s). Some two-bedroom, two-person units are available for graduate and upper-division students.

Family-style living. These accomodations are the ideal choice for families seeking an easier, more productive student lifestyle. Depending on their needs and preferences, students choose from one-, two-, and three-bedroom apartments, or the new two-bedroom townhouses. The advantage of campus convenience, along with the value of reasonable rates, is offered. Residents of Family Student Housing can experience the unique opportunity of living in a diverse community of students from all parts of the U.S. and many foreign countries.

Off-Campus Housing

All USU students have the option of living off campus. Many apartments and private rental units are conveniently located close to campus and are available to USU students. For a *Logan Off-Campus Renter's Guide*, with information about off-campus living and a list of off-campus apartments, contact the Office of High School/College Relations at 0160 Old Main Hill, Logan UT 84322-0160 or phone (435) 797-1129, or toll free 1-800-488-8108.

Undergraduate General Information

Entering Utah State University

Enrollment Services

Associate Vice President for Student Services: Lynn J. Poulsen
Director of Admissions and Records/Registrar:
R. David Roos
Associate Registrar: Elizabeth W. Allen
Assistant Director of Admissions: Stanley A. Bodily

Offices in Taggart Student Center 246

The Office of Enrollment Services performs the following academic services:

1. Admission of Undergraduate Students: interviews prospective students, evaluates credentials; processes applications.

2. Registration: conducts registration and facilitates drop/add, audit, and pass/fail adjustments. See University *Schedule of Classes* for registration procedures.

3. Records: maintains academic records, processes transcripts and all grade adjustments, facilitates advisers, major and name changes, and issues verifications.

4. Scheduling: builds and publishes University *Schedule of Classes*, assigns courses to classrooms, maintains curriculum file of approved courses.

5. Microfilm and ID: maintains microfilm records; issues student and faculty/staff ID cards.

6. Undergraduate Graduation: processes applications, verifies completion of University requirements, orders and distributes diplomas, posts degrees to transcripts, maintains graduation records.

7. Residency: counsels students on Utah residency laws, processes and evaluates residency applications, advises applicants of their status.

8. Veterans Affairs: certifies, reports, and advises U.S. veterans and qualified dependents relative to training and educational benefits.

Admission Requirements

The Utah State University admission policy is designed to admit undergraduate students who have the best chance to successfully complete a university program of study.

All freshmen, including transfer students with less than 30 semester hours of credit, must submit an official high school transcript and ACT/SAT scores as part of their application for admission.

Application for admission and credentials from schools previously attended should be received by the Admissions Office by July 1 for fall semester admission, by November 1 for spring semester admission, and by May 1 for summer semester admission.

A student is admitted to the University on the basis of an application (which includes official transcripts of credit from each school previously attended), a $35 nonrefundable application fee, and ACT/SAT scores when applicable. A processing fee of $10 is required of students applying for readmission. Contact the Admissions Office for application and general information.

Students who have attended home schooling, charter high schools, or performance/outcome-based high schools will need to submit an Application for Admission, the $35 application fee, and ACT results, and *may* need to have an interview as part of the admissions application process. Those students who have completed the GED must also submit a copy of the GED Certificate.

USU grants admission without regard to race, color, creed, sex, or national origin, to students who satisfy the admission requirements.

Students who have been denied admission to the University may appeal the decision by contacting the Admissions Office, Taggart Student Center 246. The appeal must be made no later than seven calendar days from the first class day.

Freshman Admission

Students attending the University for the first time are admitted on the basis of an index score, which is a reflection of high school grades and ACT or SAT scores. Entering students must have an acceptable index score in order to be admitted. (See Admission Index table on page 44.) Those students with an index score of 100 or higher will be admitted. Students having an index score of 90-99 are very likely to be admitted. On a space available basis, students with an index score between 85 and 89 may be admitted. Those students with an index score below 85 will likely be denied admission, but will be granted a chance to appeal upon the student's request. Exceptions to the preceding regulations will be made for applicants who have not graduated from high school, who may substitute results of the GED. In cases where the applicant is younger than 25 years, official ACT/SAT results are also required. Admission decisions will be made on an individual basis.

High School Curriculum

Students who graduated from high school after 1991 and who desire to attend Utah State University must have completed a preparatory course of study, including the following:

English. Four years (units), emphasizing composition/literature.

Mathematics. Three years (units), selected from elementary algebra, geometry, intermediate algebra, trigonometry, college or advanced algebra, or calculus. It is strongly recommended that students take mathematics up to at least trigonometry.

Biological/Physical Science. Three years (units), that meet either state or local graduation requirements. At least one unit must provide a laboratory experience.

American History. One year (unit).

Additional Courses. Four years (units), chosen from at least two of the following: history, English, mathematics beyond intermediate algebra, laboratory science, foreign language, social science, and fine arts.

Foreign Language. Two years (units) recommended, which must be of the same foreign language.

Students having less than the required number of units, but who have an admission index of 95 or higher, will be admitted on the condition that the deficiency is satisfied within the first 30 semester hours of study at the University.

When the admission decision is made, an official letter of notification will be sent to the student.

Testing. All freshmen, including transfer students with less than 30 semester hours of credit, must present the results of the ACT/SAT as part of their application for admission to the University.

Early Admission. A high school student who has completed his or her junior year and maintained a superior scholastic record may be granted special consideration for admission. An applicant must satisfy the following requirements:

1. Submit an official application, ACT/SAT scores, and a high school transcript.

2. Submit letters of approval and recommendation from:
   (a) Superintendent or principal
   (b) Parent or guardian

3. Admission is not automatic, and will be determined by the admissions committee.

4. Applications for admission and credentials from the high school must be received by the University according to the deadline dates listed under General Admissions Policies.

Nontraditional Admission. An applicant who is not a high school graduate may be considered for admission by presenting satisfactory evidence of ability to do university work. This evidence may be demonstrated by scores on the General Education Development Test (GED). Admission will not be offered unless a student has a high school diploma or a satisfactory GED Test score. (Students in this category include those whose high school class has graduated and those over the age of 18.) Students must also take the ACT/SAT if not previously taken. If the student has been out of high school for seven years or more, this requirement is waived.

General Registration. Students who do not qualify for enrollment into one of the academic colleges may be considered for enrollment in the Division of General Registration. These students include Utah residents who have graduated from high school with less than a satisfactory index number, non-Utah residents who have graduated from high school with less than a satisfactory index number, transfer students from other institutions of higher learning with less than a 2.2 GPA, and former USU students seeking readmission with less than a 2.0 GPA.

When a student has demonstrated ability to maintain a 2.0 GPA, that student may apply for admission to an academic college and department through the Associate Director of the Academic Resource Center. Regular college admissions evaluation procedures will then be made, and if there are no admissions restrictions, the student will be admitted to the department of his or her choice.

Advanced Placement. Students who present Advanced Placement examination scores of 3, 4, or 5 may receive 4 or 8 University credits for each Advanced Placement examination. These credits may be used to fill University Studies (General Education) requirements and to meet specific course requirements.

Admission Index

Test Scores

Enhanced ACT	Recentered SAT	GPA 4.0	3.9	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1
36	1600	142	140	139	137	135	133	132	130	128	126	124	123	121	119	117	116	114	112	110	108	107	105	103	101	100	98	95	94	93	91
35	1580	140	138	137	135	133	131	130	128	126	124	122	121	119	117	115	114	112	110	108	106	105	103	101	99	98	96	94	92	91	89
34	1530	138	136	135	133	131	129	128	126	124	122	120	119	117	115	113	112	110	108	106	104	103	101	99	97	96	94	92	90	89	87
33	1460	136	134	133	131	129	127	126	124	122	120	118	117	115	113	111	110	108	106	104	102	101	99	97	95	94	92	90	88	87	85
32	1410	134	132	131	129	127	125	124	122	120	118	116	115	113	111	109	108	106	104	102	100	99	97	95	93	92	90	88	86	85	83
31	1360	133	131	130	128	126	124	123	121	119	117	115	114	112	110	108	107	105	103	101	99	98	96	94	92	91	89	87	86	84	82
30	1320	131	129	128	126	124	122	121	119	117	115	113	112	110	108	106	105	103	101	99	97	95	94	92	90	89	87	85	83	82	80
29	1280	129	127	126	124	122	120	119	117	115	113	111	110	108	106	104	103	101	99	97	95	94	92	90	88	87	85	83	81	80	78
28	1240	127	125	124	122	120	118	117	115	113	111	109	108	106	104	102	101	99	97	95	93	92	90	88	86	85	83	81	79	78	76
27	1210	126	124	123	121	119	117	116	114	112	110	108	107	105	103	101	100	98	95	94	92	91	89	87	85	84	82	80	78	77	75
26	1170	124	122	121	119	117	115	114	112	110	108	106	105	103	101	99	96	95	94	92	90	89	87	85	83	82	80	78	76	75	73
25	1140	122	120	119	117	115	113	112	110	108	105	104	103	101	99	97	96	94	92	90	88	87	85	83	81	80	78	76	74	73	71
24	1100	120	118	117	115	113	111	110	108	106	104	102	101	99	97	96	94	92	90	88	86	85	83	81	79	78	76	74	72	71	69
23	1060	118	116	115	113	111	109	108	106	104	102	100	99	97	95	93	92	90	88	86	84	83	81	79	77	76	74	72	70	69	67
22	1030	117	115	114	112	110	108	107	105	103	101	99	98	96	94	92	91	88	87	85	83	82	80	78	76	75	73	71	69	68	65
21	990	115	113	112	110	108	106	105	103	101	99	97	96	94	92	90	89	87	86	83	81	80	78	76	74	73	71	69	67	66	64
20	950	113	111	110	108	106	104	103	101	99	97	95	94	92	90	88	87	85	83	81	79	78	76	74	72	71	69	67	65	64	62
19	910	111	109	108	106	104	102	101	99	97	95	93	92	90	88	86	85	83	81	79	77	76	74	72	70	69	67	65	63	62	60
18	860	109	107	106	104	102	100	99	97	95	93	91	90	88	86	84	83	81	79	77	75	74	72	70	68	67	65	63	61	60	58
17	820	108	106	105	103	101	99	98	96	94	92	90	89	87	85	83	82	80	78	76	74	73	71	69	67	65	64	62	60	59	57
16	770	106	104	103	101	99	97	96	94	92	90	88	87	85	83	81	80	78	75	74	72	71	69	67	65	64	62	60	58	57	55
15	720	104	102	101	99	97	95	94	92	90	88	86	85	83	81	79	78	76	74	72	70	69	67	65	63	62	60	58	56	55	53
14	670	102	100	99	97	95	93	92	90	88	86	84	83	81	79	77	76	74	72	70	68	67	65	63	61	60	58	56	54	53	51
13	600	100	98	97	95	93	91	90	88	86	84	82	81	79	77	75	74	72	70	68	66	65	63	61	59	58	56	54	52	51	49
12	540	99	97	95	94	92	90	89	87	85	83	81	80	78	76	74	73	71	69	67	65	64	62	60	58	57	55	53	51	50	48
11	480	97	95	94	92	90	88	87	85	83	81	79	78	76	74	72	71	69	67	65	63	62	60	58	56	55	53	51	49	48	46
10	430	95	93	92	90	88	86	85	83	81	79	77	76	74	72	70	69	67	65	63	61	60	58	56	54	53	51	49	47	46	44
9	400	93	91	90	88	86	84	83	81	79	77	75	74	72	70	68	67	65	63	61	59	58	56	54	52	51	49	47	45	44	42
8	380	92	90	89	87	85	83	82	80	78	76	74	73	71	69	67	65	64	62	60	58	57	55	53	51	50	48	46	44	43	41
7	350	90	88	87	85	83	81	80	78	76	74	72	71	69	67	65	64	62	60	58	56	55	53	51	49	48	46	44	42	41	39
6	320	88	86	85	83	81	79	78	76	74	72	70	69	67	65	63	62	60	58	56	54	53	51	49	47	46	44	42	40	39	37
5	290	86	84	83	81	79	77	76	74	72	70	68	67	65	63	61	60	58	56	54	52	51	49	47	45	44	42	40	38	37	35

Credit by Special Examination. Students may challenge a course for credit by taking a special departmental examination which surveys knowledge of course content. Students who perform successfully on a challenge exam can receive credit for the course.

University credit is awarded for examinations in subjects the student has not taken. To determine which courses are available for challenge, a student should consult the appropriate academic department.

Credits earned by challenge exam cannot be used toward a graduate degree nor used to meet the USU course requirement for graduation.

Application forms for permission to take special examinations are available in the Records Office, SC 246.

CLEP General Exams. Up to 30 credits may be acquired through the College Level Examination Placement (CLEP) general examinations. These credits may be used to fill University Studies (General Education) requirements, but are not designed to meet specific course requirements.

CLEP Subject Exams. Many of the CLEP subject examinations are also accepted as equivalent to specific courses. For a complete list of examinations accepted and scores necessary to receive credit, inquire at Testing Services, University Inn 115, (435) 797-1004.

International Baccalaureate. USU recognizes the International Baccalaureate diploma and awards credits for University Studies (General Education) requirements, excluding the Breadth American Institutions, Communications Literacy, and mathematics Quantitative Literacy requirements necessary for graduation.

Students who have not completed the International Baccalaureate diploma receive 8 credits for scores of 5, 6, or 7 acheived on the higher-level exams.

Credit achieved through the International Baccalaureate examinations may not be duplicated with AP credit.

Credit for Military Service. The University may grant credit to students currently enrolled at the University who have served in the armed forces. Applications for credit are made by submitting the DD214 or DD295 form to the Office of Admissions.

Army/ACE Registry Transcript System (AARTS). Enlisted soldiers who entered active duty on or after October 1, 1981 are eligible for an AARTS transcript. However, the AARTS transcript is *not available* to members of the U.S. Army Reserve, warrant officers, or commissioned officers. Those students who are eligible for an AARTS transcript and who are seeking credit for military service in the **Army** should provide the Admissions Office with an AARTS transcript *instead of* the DD214 or DD295 form. Eligible students may obtain transcript request forms from their Army education center counselors, or they may write directly to: Manager, AARTS Operations Center, 415 McPherson Avenue, Ft. Leavenworth KS 66027-1373. Each request must include the student's name, basic active service date, social security number, and current mailing address.

Veterans Educational Benefits. Veterans or qualified dependents of disabled or deceased veterans who may be eligible for Veterans Educational Benefits should contact the Office of Veterans Affairs, or telephone (435) 797-1102 for information concerning their educational benefits. Veterans or eligible dependents must make application for admission and be matriculated in a degree program.

Transfer Student Admission. Applicants with at least 45 quarter or 30 semester credits earned at another accredited institution will be considered for admission if they have a cumulative GPA of 2.2 or higher. Many USU undergraduate majors require a higher GPA for admissions. For specific GPA requirements, refer to this catalog or consult the departments. Transfer students with more than 45 quarter or 30 semester credits and with less than a 2.2 GPA will be considered for admission to General Registration on an individual basis (if they have less than 90 total credits).

Official transcripts of credit must accompany applications for admission when submitted by students who have attended other collegiate institutions. Transcripts submitted for admission become the property of the University and are not returned. *Transcripts from all institutions previously attended are required.*

At its discretion, the University may accept transfer credit from accredited and nonaccredited institutions and miscellaneous sources. These may include:

(1) accredited institutions, (2) foreign universities, (3) U.S. military credit for approved job and educational experiences, (4) credit by examination, (5) miscellaneous sources: internships, nontraditional learning experiences.

The following evaluation criteria for acceptance will be used:

(1) accreditation status of the institution, (2) recognized national standards published by the American Association of Collegiate Registrars and by the American Council on Education, (3) guidelines given by the State Board of Regents (including guidelines for CLEP and AP credit), and (4) recommendations given by various University units having appropriate academic competence, including: Faculty Senate, college and departmental curriculum committees.

Utah State University does not accept transfer credit from nonaccredited institutions in those cases where USU lacks an academic unit to evaluate such transfer credits.

Credit Transfer Policy of Utah System. An Associate of Arts or an Associate of Science degree earned at any institution within the Utah System of Higher Education, or at other non-Utah institutions with articulation agreements, will be considered as meeting the General Education requirement of any institution in the system. When the General Education requirements of an institution not offering the Associate of Arts or Associate of Science degree have been met in earning a 60 to 63 semester credit hour diploma, a Registrar's certification that the transferring student has completed baccalaureate-level General Education requirements at the sending institution will be accepted by the receiving USHE institution in lieu of the AA/AS degree. In the latter case, the Registrar at the sending institution will forward to the receiving institution an up-to-date description of the General Education requirements.

Credit for quarter courses numbered 100 or above, or for semester courses numbered 1000 or above, earned in the Utah System of Higher Education is transferable within the System and will be carried on the student's transcript by the receiving institution. **Acceptance of credit should not be confused with its application. Transfer credit may or may not apply to the graduation requirements of an institution, regardless of the number of credits transferred.** Credit other than that intended wholly to meet the General Education requirements of the receiving institution will be applied on the basis of the appropriateness of credit to a particular institution's specific degree program requirements as determined by the receiving institution.

International Undergraduate Student Admission. The following fees, documents, and information should be submitted to the Admissions Office three months (March 1, summer semester; May 1, fall semester; October 1, spring semester) prior to the beginning of the semester for which an international student wishes to be considered for admission:

1. Utah State University application for admission for students outside the United States and a $35 application fee.

2. One copy of official transcripts and certificates or certified true copies for each secondary school, college, and university attended with official English translation of all documents.

3. Evidence of financial capability must be provided with the application, as specified on the application form.

4. International students must be proficient in the use of English. Proficiency is determined for undergraduates by a minimum TOEFL score of 500, or a Michigan test score of 80, or by passing level 4 (advanced level) of the Intensive English program at Utah State University. For graduate students, proficiency is determined by a minimum TOEFL score of 550, or passing level 4 (advanced level) of Intensive English at Utah State University.

Qualified students in level 4 (advanced level) of Intensive English may take one or more academic courses if approved by the Intensive English staff and their University adviser. Graduate students need the additional approval of the Dean of Graduate Studies. Students at any level may audit academic courses with approval of the Intensive English staff.

Failure to carry a full course of study (at least 12 credit hours per semester for undergraduates), or failure to make satisfactory progress towards the receipt of an undergraduate or advanced degree, or failure to comply with any other immigration requirements for students attending USU, will be grounds for suspension or dismissal in accordance with existing University policy.

Graduate Admission. Any student who has graduated from USU or any other university must apply to the School of Graduate Studies for admission and present two copies of an official transcript.

Readmission. Students who were in attendance the previous spring semester are not required to reapply for fall semester unless the student withdrew from the University or if suspension or graduation occurred at the conclusion of the spring semester. Former students of the University returning after an absence of one or more semesters are required to file applications for readmission.

Residency Application and Appeal. Nonresident students who feel they have met the requirements for instate resident student status must file an official residency application with the Residency Office, Taggart Student Center 246, **no later than seven calendar days from the first class day and not more than 30 days before the beginning of the semester for which residency is sought.** Those missing the application deadline will have residency considered for the next semester, provided that the next appropriate deadline is met with adequate updated documentation.

If an application is denied by the Residency Officer, the student may appeal to the Residency Appeals Committee no later than the tenth class day of the semester. Appeals cannot be considered after this deadline.

Procedures concerning residency are as follows:

1. Persons claiming residency on their application for admission, but who are coded nonresident, will be notified in writing of their nonresident status.

2. Definition of a resident student

(a) Students who attend the University on a full-time basis are presumed to have moved to Utah for the purpose of attending an institution of higher education and are nonresidents for tuition purposes. The burden of rebutting this presumption is upon the person seeking resident status. Mere presence in the state is not sufficient for establishing residency. This presence must be coupled with clear and convincing evidence that a person has established a domicile in the state beyond the circumstance of being a student and that the student does not maintain a residence elsewhere.

(b) Aliens who are present in the United States on visitor, student, or other visas which authorize only temporary presence in this country do not have the capacity to intend to reside in Utah for an indefinite period and therefore must be classified as nonresident.

(c) Aliens who have been granted immigrant or permanent resident status in the United States shall be classified for purposes of resident status according to the same criteria as citizens.

(d) Any American Indian who is enrolled on the tribal rolls of a tribe whose reservation or trust lands lie partly or wholly within Utah or whose border is at any point contiguous with the border of Utah or any American Indian who is a member of a federally recognized or known Utah tribe and who has graduated from a high school in Utah, shall be entitled to resident status.

3. Handouts listing the policy and deadlines will be provided to students who inquire about residency.

Western Undergraduate Exchange. Utah State University participates in the Western Undergraduate Exchange (WUE), a program of the Western Interstate Commission for Higher Education. Through WUE, certain students who are not residents of the state of Utah may enroll at Utah State University in designated programs, paying resident tuition plus 50 percent of that amount (plus other fees that are paid by all students).

Because Utah State University participates, residents of Utah may enroll under the same terms in designated institutions and programs in other participating states.

Information about WUE programs available at USU may be obtained from the Admissions Office, SC 246, 1600 Old Main Hill, Utah State University, Logan UT 84332-1600, tel. (435) 797-1107. Utah residents may obtain information about WUE programs in other states from the Certifying Officer for Utah WICHE Student Exchange Program, #3 Triad Center, Suite 550, 355 West North Temple, Salt Lake City UT 84180-1205, tel. (801) 321-7124 or from WICHE Student Exchange Program, P.O. Box 9752, Boulder CO 80301-9752, tel. (303) 541-0214 or 0210, FAX (303) 541-0291.

Cooperative education and/or internships. Cooperative education involves faculty and employers in a partnership to provide a student with a blend of academic and on-the-job experiences. Interested students should contact their academic department or the Office of Cooperative Education, UI 102.

New Student Orientation

Orientation for All New USU Undergraduate Students

Newly admitted students, both first year and transfer, are required to attend a Student Orientation, Advising, and Registration (SOAR) program before being permitted to register for classes. SOAR is designed to assist students in making a successful transition to USU. In addition to registering for classes, students have the opportunity to receive individual advice about degree requirements, as well as vital information about student services, campus life, and athletics. SOAR also gives students a chance to make new friends. New students should be aware that a *registration hold* is placed on their file until some form of orientation is completed. After admission to USU, students will receive information about SOAR programs. For further information or to receive a SOAR application, call New Student Orientation at (435) 797-0283 or 1-800-606-4878.

Academic Advising

Upon admission to USU, all new students are assigned to an academic adviser. During the New Student Orientation, students meet with their advisers, plan their class schedules, and register for classes. Advising is the process encompassing development and delivery of accurate and up-to-date information regarding career options, educational programs, courses of instruction, resources, policies, and procedures to aid students in pursuing their educational goals.

Each student should consult with his or her academic adviser on a regular basis, and as needed, until the student's program of study is completed. The adviser can help the student to select, plan, and complete a program of study which is consistent with the student's interests, abilities, and needs, and can assist the student in selecting appropriate courses in the proper sequence to complete all requirements for graduation.

Each student is responsible for learning and completing graduation requirements for academic programs selected. Major Requirement Sheets showing University, college, and departmental requirements for each academic program are provided by the student's academic department or college, and all sheets are also available in the University Advising and Transition Services Office. This office provides students with information and advisement concerning University academic requirements, policies, procedures, programs, and services.

The College or Division Academic Service Centers provide students with information and advisement concerning academic requirements, policies, procedures, programs, and services of that college or division. A listing of Academic Service Centers is provided below:

University Advising and Transition Services—SC 302, (435) 797-1128

Division of General Registration—SC 302, (435) 797-3373

College Academic Service Centers

College of Agriculture, AG S 218, (435) 797-2215
College of Business, BUS 306, (435) 797-2274
College of Education, EDUC 101, (435) 797-1437
College of Engineering, EC 110, (435) 797-2705
College of Family Life, FL 205A, (435) 797-1530
College of Humanities, Arts and Social Sciences, SC 304, (435) 797-4029
College of Natural Resources, NR 112, (435) 797-2448
College of Science, SER 101, (435) 797-2481

Advisement for Undeclared Majors and Liberal Arts and Sciences Program

Science/HASS Advisement Center, SC 304, (435) 797-3883

Undergraduate Graduation Requirements

At the undergraduate level, the University offers an Associate of Applied Science degree, the degrees of Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Landscape Architecture, Bachelor of Music, and Bachelor of Science, and provides coursework which will satisfy requirements for all professional certificates issued by the State Board of Public Instruction. Certificates and diplomas are offered for one- and two-year programs in certain departments.

For information about graduate degees and majors offered by USU, see page 58 of this catalog.

Certificates, Diplomas, and Associate of Applied Science Degrees

Certificates, diplomas, and Associate of Applied Science degrees are awarded for completion of less-than-baccalaureate programs at Utah State University. As defined by the Utah State Board of Regents, a certificate is awarded upon the successful completion of a program directly oriented toward job entry when the program is of a duration of 18 months or less (1-48 semester credit hours). The Regents define a diploma or Associate of Applied Science program as one directly oriented toward job entry when the program is of a duration of 19-36 months (49-96 semester credit hours).

The Colleges of Agriculture, Business, Engineering, and Humanities, Arts and Social Sciences offer one- and two-year programs leading to certificates, diplomas, and Associate of Applied Science degrees. One-year certificate programs are available in dairy technology, agricultural machinery technology, and ornamental horticulture. Diplomas and Associate of Applied Science degrees include aeronautics, technical drafting, agricultural machinery technology, office systems support, and ornamental horticulture.

In most cases, the courses in the diploma and Associate of

Applied Science programs are arranged so that, at a later date, the four-year baccalaureate program can be completed with a minimum loss of time.

Associate of Applied Science Degree

A minimum of 60 credit hours is required for an Associate of Applied Science degree. Requirements include coursework in the following areas: primary area of study, related area, general education, and electives.

See department offerings for specific requirements. Associate of Applied Science degrees are offered in the following areas: aeronautics, technical drafting, office systems support, ornamental horticulture, and agricultural machinery technology.

Bachelor's Degrees

The University confers the baccalaureate degree upon students who meet the specified requirements of any of the eight resident colleges.

Graduates of the Colleges of Engineering and Natural Resources are eligible to receive the Bachelor of Science degree. The Bachelor of Arts degree is not offered in these colleges, with the exception of the Department of Geography and Earth Resources, where Bachelor of Science and Bachelor of Arts degrees are offered.

Graduates of the Colleges of Agriculture, Business, Education, Family Life, and Science may be awarded the Bachelor of Science degree or the Bachelor of Arts degree as recommended by the student's individual department and approved by the dean of the college.

Graduates of the College of Humanities, Arts and Social Sciences may be awarded the Bachelor of Science Degree, the Bachelor of Arts degree, the Bachelor of Fine Arts degree, the Bachelor of Landscape Architecture degree, or the Bachelor of Music degree as recommended by the student's individual department and approved by the dean of the college.

All graduates, regardless of the type of degree, must satisfy University Studies (General Education) requirements.

Bachelor of Arts Degree

All students who receive the Bachelor of Arts degree must have completed two years' training or equivalent in a foreign language approved by the Languages and Philosophy Department. One year or equivalent in each of two foreign languages may also satisfy the foreign language requirement for the BA degree. Specifically, the BA language requirement may be completed in one of the following ways:

1. Completion of 16 credits in one foreign language.

2. Completion of 20 credits in two foreign languages.

3. In general, completion of course number 2020 in one of the foreign languages or an upper-division (3000-level or above) foreign language grammar or literature course. Conversation classes generally cannot be considered in satisfying this requirement.

4. Successful completion of the Intensive English Language Institute (IELI) program for international students.

5. TOEFL, Michigan, or IELI placement scores high enough to meet the University admission criteria.

Bachelor's Degree Requirements

Academic Program Requirement. All graduates are required to complete an approved academic program in one of the eight resident colleges.

American Institutions. All graduates are required to have an understanding of the fundamentals of the history, principles, form of government, and economic system of the United States. Students may meet this requirement in any one of the following ways: (a) receiving a passing grade on a special examination; (b) receiving a grade of three or better on the Advanced Placement Examination in American History; (c) satisfactory completion of: History 1700; History 2700 *and* 2710; Political Science 1100; Economics 1500; USU 1300; or Honors 1300H; or (d) satisfactory completion of a transfer course equivalent to one of the courses in (c).

General Education. Completion of the University Studies (General Education) requirements. (See pages 50-53.)

Upper-Division Credits. Completion of a minimum of 40 credits numbered 3000 or above.

Total Credits. A minimum of 120 credits of acceptable collegiate work and a minimum of 100 credits with a grade of *C-* or better.

GPA. In order to graduate, students must meet all GPA requirements for their major. These requirements can be found in the *Instructional Units and Programs* section of this catalog. USU credits *only* are used in computing the GPA.

Major. Each student must complete all requirements for an approved program of study. This program is comprised of up to 80 credits, which include the major, certification requirements, and all other required major coursework. The program of study for each major is described in the appropriate departmental section of this catalog and on the major requirement sheets, which can be obtained from the department, the college, or the Office of Advising and Transition Services.

Students should select a major subject upon entering the University or early the first year, but not later than entrance into the upper division. As soon as the major subject has been selected, the student should contact the department in which he or she has decided to major. The dean or the head of the department will assign an adviser. Registration in each succeeding semester should be carefully checked and approved by the adviser to assure proper selection of courses for satisfying institutional and departmental requirements. If more than one major is being pursued concurrently, departmental and college authorization must be obtained.

Students who have completed at least 60 credits (not including AP, CLEP, and concurrent enrollment) and one USU semester must be accepted into a department or be admitted to General Registration before they are allowed to register for additional work. To enforce this policy, a hold will be placed on the student's registration.

The selection of a major(s), the fulfillment of requirements, and a choice of a career or vocation are the responsibility of the student. The University does not assume responsibility for these choices nor for successful employment upon completion of University programs. However, to aid in these choices, the University provides advising, counseling, and testing services for self-evaluation and information about careers and employment opportunities. Career Services assists students in all aspects of their career search.

Minor. USU does not require that all students complete a minor. However, some departments and/or programs do require completion of a minor, which is described in the catalog statement of the department or program. When a minor is required, it is part of the professional component.

In the event a student elects to complete a minor not required by the student's major department or program, the student may develop a minor from an approved major in another department. In such cases, the elective minor must consist of not less than 12 credits, and the program must be approved by both departments.

USU Courses. Candidates for a bachelor's degree must complete at least 30 USU credits at USU's Logan campus or designated centers, or through classes offered by distance education through USU. Ten of the required USU credits must be included within the last 40 credits presented for the degree.

Upon recommendation of the department and with the concurrence of the college dean, a candidate for a degree may complete, when appropriate, the minimum requirements for USU credits through USU courses taken away from the USU Logan campus.

Independent Study Credits. The maximum amount of independent study credit which may be applied toward a bachelor's degree is 30 credits.

Credit by Examination. Some noncollegiate experiences may permit credit through challenge and foreign language examinations. For further information, see page 45.

Community College Credit. No more than 80 credits of transfer credit from community colleges may be applied toward graduation.

Remedial Courses. Remedial courses numbered below 1000, cannot be used to satisfy baccalaureate requirements.

Honors. To qualify for graduation honors, a student must have completed a minimum of 40 USU semester credits. USU designated honors at graduation are:

Summa Cum Laude	3.950 to 4.000 GPA
Magna Cum Laude	3.800 to 3.949 GPA
Cum Laude	3.500 to 3.799 GPA

These grade point averages are USU cumulative GPAs. Transfer credits are not considered in determining eligibility for graduation honors.

General Information

Extension and Independent Study. Applicants for degrees who have taken courses for credit through extension classwork or Independent Study courses are subject to regular University admission requirements and must file transcripts of all university credit with the Office of Admissions.

Financial Obligations. Students are reminded that nonpayment of fees owed to the University may result in withholding of diplomas or certificates.

Independent Study. Grades for Independent Study courses must be completed and on file in the Records Office by the last day of the semester of intended graduation.

Incomplete Grades. Incomplete grades must be made up and on file in the Records Office no later than the last day of the semester for which the candidate is applying for graduation.

Changes in Graduation Requirements. Students are expected to familiarize themselves with the rules and regulations of both the University and their specific major. Detailed information concerning graduation requirements is available in this catalog as part of the departmental descriptions. Responsibility for satisfying all graduation requirements rests upon the student. Utah State University reserves the right to change graduation requirements at any time. Students who can complete a baccalaureate degree within seven years of enrollment at USU can qualify for graduation by meeting (1) the General Education/University Studies requirements in effect when they initially enrolled and (2) the major requirements in effect when they officially declared their major, even though there may have been changes in General Education/University Studies and major requirements since that time. Students who have not completed the baccalaureate requirements within seven years of their initial enrollment at USU must have their General Education/University Studies and major requirements evaluated and approved by their department head and dean.

Applying for Graduation

Undergraduate candidates for graduation must have completed the application process by having an application on file and fees paid to the Graduation Office. The application deadline is one week prior to the first day of early registration for the intended graduation semester. Late applicants will be assessed a $10 late fee. For example, students who intend to graduate spring semester must accomplish the application process one week prior to the first day of early registration for spring semester.

Students must complete the application process by sequentially following these steps: (1) Request application in the Graduation Office, (2) carefully review instruction sheet for graduation application instructions, signatures, deadlines, etc., (3) submit application to department adviser and college dean for review and signatures, (4) pay application fee of $10 in Cashiers Office. Approximately one month is needed to complete the application process. Double majors must have the appropriate signatures for each major.

Names of the candidates will appear on the graduation lists and diplomas as they appear on the student's transcript.

Reapplication for Graduation. Students who do not successfully complete graduation requirements by the end of spring semester must reapply for graduation for the new academic year.

Commencement

Candidates who completed requirements and received their diplomas at the end of summer or fall semester are invited and encouraged to attend commencement exercises with the spring semester graduates.

Attendance at Commencement is expected of all candidates. If unable to attend, the student must notify the dean of his or her college and be officially excused in advance. Also, the student must notify the Graduation Office of the address to which the diploma is to be sent. Participation in commencement exercises does not ensure that the candidate has satisfied graduation requirements.

Second Bachelor's Degree

A student who wishes to qualify for a second bachelor's degree must complete a minimum of 30 credits beyond those required for

the first four-year degree, 20 of which must be USU credits taken at USU's Logan campus or at designated centers, or through classes offered by distance education through USU. Candidates for a second bachelor's degree must file an application with the Admissions Office and obtain the recommendation of their academic dean. Candidates must also meet the requirements of the major department.

Candidates for a second bachelor's degree must have met the American Institutions requirement in the first bachelor's degree, or complete the requirement before receiving the second bachelor's degree.

Note: The first bachelor's degree must have been awarded by an accredited college or university.

Split Form

A student who is within 30 credit hours of completing a baccalaureate degree may file a Split Form showing division of classes between two undergraduate degrees, or an undergraduate and graduate degree. **These classes must be identified each semester on a Split Form.**

For a second bachelor's degree, an Application for Admission to the second bachelor's degree program must be submitted to the Admissions Office. A Split Form must be obtained from the Graduation Office and be filed prior to the posting of grades for the semester in which the request is submitted. The form must be signed by the student's adviser and college dean of both majors.

For more information about dividing classes between an undergraduate and a graduate degree, see *Split Form Policy* (page 62).

USU University Studies (General Education) Requirements

University Studies Objectives: The Citizen Scholar

The mission of undergraduate education at Utah State University is to help students develop intellectually, personally, and culturally, so that they may serve the people of Utah, the nation, and the world. USU prepares citizen-scholars who participate and lead in local, regional, national, and global communities. General education is an integral part of every student's university experience—in both lower-division and upper-division courses. A solid general education foundation, combined with concentrated study in a major discipline and interdisciplinary studies, provides the breadth and depth of knowledge qualifying USU graduates as educated citizens.

USU's general education program is intended to help students learn how to learn—not just for the present, but also for the future. No individual can master all, or even a small portion, of society's knowledge, but students can learn the basic patterns used to obtain and organize information, enabling them to discover or recover knowledge. General education involves a series of interrelated educational experiences which stimulate and assist students in becoming self-reliant scholars and individuals. The ultimate objective is for general and discipline-specific education to complement each other in helping students to:

1. understand processes of acquiring knowledge and information;
2. reason logically, critically, creatively, and independently, and be able to address problems in a broad context;
3. recognize different ways of thinking, creating, expressing, and communicating through a variety of media;
4. understand diversity in value systems and cultures in an interdependent world; and
5. develop a capacity for self-assessment and lifelong learning.

By introducing ideas and issues in human thought and experience, general education courses help students achieve the intellectual integration and awareness needed to meet the challenges they will face in their personal, social, and professional lives. General education courses emphasize how knowledge is achieved and applied in different domains. Collectively, they provide a foundation and perspective for:

1. understanding the nature, history, and methods of the arts and humanities, as well as the natural and physical sciences;
2. understanding the cultural, historical, and natural contexts shaping the human experience; and
3. interpreting the important cultural, socio-economic, scientific, and technological issues of the diverse global community in which we live.

A university education prepares students to work and live meaningfully in today's rapidly changing global society. Together, general and discipline-specific education help students master the essential competencies making this goal possible. These competencies include:

1. reading, listening, and viewing for comprehension;
2. communicating effectively for various purposes and audiences;
3. understanding and applying mathematics and other quantitative reasoning techniques;
4. using various technologies competently; and
5. working effectively, both collaboratively and individually.

University Studies Requirements (30 credits)

(plus three courses, which most students take as part of their major)

The University Studies program, along with study in the major, is designed to assist students in achieving the Citizen

Scholar Objectives. The program consists of three sets of requirements: Competency, Breadth, and Depth.

Competency Requirements (9 credits)

(plus three courses, which most students take as part of their major)

The Citizen Scholar Objectives propose that students should be able to communicate effectively, utilize quantitative methods, make appropriate use of technology, and function effectively in groups. The competency requirements are structured to develop these skills.

Communications Literacy (CL) (6 credits)
Plus two Communications Intensive (CI) Courses

Engl CL 1010. Introduction to Writing: Academic Prose. (3)

or

AP English Test: Score of 3 or better

or

ACT English Test: Score of 29 or better (waives Engl 1010)

or

English CLEP Test: Score of 500 or better

AND

Engl CL 2010. Intermediate Writing: Research Writing in a Persuasive Mode. (3)

AND

Two courses designated as Communications Intensive (CI). For most students, courses taken for the major will meet this requirement.

Computer and Information Literacy (0 credits)

No specific course is required, but students must pass a competency exam in computer and information literacy. Additional information about this exam can be found on page 53. Communications and Quantitative Literacy, Breadth, and Depth courses associated with University Studies are intended to further develop these skills.

Quantitative Literacy (QL) (3 credits)
Plus one Quantitative Intensive (QI) course

Math QL 1030. Quantitative Reasoning. (3)

or

Math QL 1050. College Algebra. (4)

or

Stat QL 1040. Introduction to Statistics. (3)

or

One Mathematics or Statistics course requiring Math 1050 as a prerequisite

or

AP Math: Score of 3 or better

AND

One course designated as Quantitative Intensive (QI). For most students, a course taken for the major will meet this requirement.

Collaborative Learning and Group Decision Making (0 credits)

No specific course is required, but Communications Literacy, Breadth, and Depth courses associated with University Studies are intended to further develop these skills.

Breadth Requirements (15 credits)

University Studies breadth requirements are intended to introduce students to the nature, history, and methods of different disciplines; and to help students understand the cultural, historical, and natural contexts shaping the human experience. Breadth courses also focus on the important cultural, socio-economic, scientific, and technological issues of today's global community.

Students must take a minimum of 15 total credits, including at least one course from each of the five categories shown below which are *outside the student's major category* (e.g., Sociology majors would not be required to take a Social Sciences course). The category in which each major fits is shown on pages 52-53.

All students must take an American Institutions course. At least two of the five breadth courses must be University Studies courses (USU 1300, 1310, 1320, 1330, and 1340). USU 1310 (Integrated Science) can be used to fill either the Life Sciences or the Physical Sciences requirement (e.g., a student could take USU 1310 and then select another approved course from either the Physical or Life Sciences). Students enrolled in the Honors Program may substitute Honr 1300H, 1310H, 1320H, 1330H, and 1340H for USU 1300, 1310, 1320, 1330, and 1340. Students should check with their advisers to determine which Advanced Placement and CLEP examinations and scores can be used to meet Breadth requirements.

Breadth Life Sciences (BLS) or (BSC)

One of the following courses or 3 credits of AP or CLEP.

USU BSC 1310. Integrated Science. (3)

Anth BLS 1020. Biological Anthropology. (3)

Biol BLS 1010. Biology and the Citizen. (3)

Biol BLS 1220. Biology II. (3)

FW BLS 1200. Biodiversity: Its Conservation and Future. (3)

Honr BSC 1310H. Integrated Science. (3)

NFS BLS 1020. Science and Application of Human Nutrition. (3)

PlSc BLS 2000. Plants, Genes, and Agriculture. (3)

RLR/FW BLS 2200. Ecology of Our Changing World. (3)

Breadth Physical Sciences (BPS) or (BSC)

One of the following courses or 3 credits of AP or CLEP.

USU BSC 1310. Integrated Science. (3)

Bmet BPS 2000. The Atmosphere and Weather. (3)

Chem BPS 1010. Introduction to Chemistry. (3)

Chem BPS 1120. General Chemistry II. (4)

Chem BPS 1220. Principles of Chemistry II. (4)

CS BPS 1010. Foundations of Computer Science. (3)

Geog BPS 1130. Physical Geography. (3)

Geol BPS 1100. Exploring the Changing Earth: Introduction to Geology. (3)

Geol BPS 1150. The Dynamic Earth: Physical Geology. (4)

Honr BSC 1310H. Integrated Science. (3)

Phyx BPS 1000. Introductory Astronomy. (3)

Phyx BPS 1100. Great Ideas in Physics. (3)

Phyx BPS 1200. Introduction to Physics by Hands-on Exploration. (4)

Phyx BPS 2120. The Physics of Living Systems II. (4)

Soil BPS 2000. Soils, Waters, and the Environment. (3)

Breadth Humanities (BHU)

One of the following courses or 3 credits of AP or CLEP.

USU BHU 1320. Civilization: Humanities. (3)

Art BHU 2710. Survey of Western Art: Prehistoric to Medieval. (3)
Art BHU 2720. Survey of Western Art: Renaissance to Post-Modern. (3)
Engl BHU 1030. Understanding Literature. (3)
Engl/Hist/Anth BHU 1710. Introduction to Folklore. (3)
Engl BHU 2030. Introduction to Shakespeare. (3)
Engl/Hist BHU 2040. British and Commonwealth Cultures. (3)
Hist BHU 1020. Cultural and Economic Exchange in the Pre-Nineteenth Century World. (3)
Hist BHU 1030. The Modern World. (3)
Hist BHU 1040. Foundations of Western Civilization: Ancient and Medieval. (3)
Hist BHU 1050. Foundations of Western Civilization: Modern. (3)
Hist BHU 1060. Introduction to Islamic Civilization. (3)
Honr BHU 1320H. Civilization: Humanities. (3)
Phil BHU 1010. Introduction to Philosophy. (3)
Phil BHU 1200. Practical Logic. (3)
Phil BHU 2400. Ethics. (3)
Phil BHU 2500. Social Ethics. (3)
Thea BHU 1030. Exploring Performance Through Literature. (3)

Breadth Social Sciences (BSS)

One of the following courses or 3 credits of AP or CLEP.

USU BSS 1340. Social Systems and Issues. (3)
Anth BSS 1010. Cultural Anthropology. (3)
ASTE BSS 2900. Humanity in the Food Web. (3)
Comm BSS 1000. Introduction to Mass Communication. (3)
Comm BSS 2000. Media Smarts: Making Sense of the Information Age. (3)
FHD BSS 1500. Human Development Across the Lifespan. (3)
FHD BSS 2400. Marriage and Family Relationships. (3)
Geog BSS 1030. World Regional Geography. (3)
Geog BSS 2030. Human Geography. (3)
HEnv BSS 1150. Diversity in Culture and Dress. (3)
HEnv BSS 2280. Gender Roles in Human Environments. (3)
Honr BSS 1340H. Social Systems and Issues. (3)
NR BSS 1010. Humans and the Changing Global Environment. (3)
NR BSS 2340. Natural Resources and Society. (3)
PolS BSS 1010. Government and the Individual. (3)
PolS BSS 2200. Comparative Politics. (3)
Psy BSS 1010. General Psychology. (3)
Soc BSS 1010. Introductory Sociology. (3)

Breadth Creative Arts (BCA)

One of the following courses or 3 credits of AP.

USU BCA 1330. Civilization: Creative Arts. (3)
Art BCA 1100. Exploring Art. (3)
Art BCA 1110. Drawing I. (3)
Art BCA 1120. Two-Dimensional Design. (3)
HEnv BCA 1750. Design in Everyday Living. (3)
HEnv BCA 1850. Design Theory. (2)
Honr BCA 1330H. Civilization: Creative Arts. (3)
Musc BCA 1010. Introduction to Music. (3)
Thea BCA 1010. Understanding Theatre. (3)
Thea BCA 1020. Introduction to Film. (3)

Breadth American Institutions (BAI)

Required for all students. One of the following courses or 3 credits of AP or CLEP.

USU BAI 1300. U.S. Institutions. (3)
Econ BAI 1500. Introduction to Economic Institutions, History, and Principles. (3)
Hist BAI 1700. American Civilization. (3)
Hist BAI 2700 and BAI 2710. U.S. History. (6)
Honr BAI 1300H. U.S. Institutions. (3)
PolS BAI 1100. U.S. Government and Politics. (3)

Depth Requirements (6 credits)

The University Studies Objectives recommend that general education should be an integral part of every student's experience—in both lower-division and upper-division courses. The depth requirement provides an opportunity for students to take upper-division courses outside of their major.

Two approved 3000-level or above courses must be taken from two of the following three categories: **Depth Life and Physical Sciences (DSC)**, **Depth Humanities and Creative Arts (DHA)**, and **Depth Social Sciences (DSS)**. Each student must select one course from each of the two categories which *do not* include his or her major (e.g., Sociology majors would select one 3000-level or above course from the Depth Humanities and Creative Arts and one 3000-level or above course from the Depth Life and Physical Sciences). Course listings in the *Instructional Units and Programs* section of this catalog include a depth prefix prior to the course number of each course which may be used to meet the depth requirement (e.g., DSC—Depth Life and Physical Sciences, DHA—Depth Humanities and Creative Arts, and DSS—Depth Social Sciences). For an updated list of approved depth courses, refer to the current semester's *Schedule of Classes* or the University Studies Web Page which can be accessed from the USU Home Page (http://www.usu.edu).

Categorization of Majors for Breadth and Depth Requirements

University Studies breadth and depth requirements specify that students must take courses outside their major. The following categorization of majors is used for this purpose. For example, Nutrition and Food Sciences is classified as a Life Sciences major. Thus, an NFS major would not be required to take a Life Sciences breadth course and would not be required to take a depth course in Life and Physical Sciences. The categories are designated by the following abbreviations: **LS—Life Sciences**, **PS—Physical Sciences**, **HU—Humanities**, **CA—Creative Arts**, and **SS—Social Sciences**. When a department name is listed with a category designation, *all majors* within that department are within the category listed.

College of Agriculture

Agricultural Economics, **SS**
Soil Science, **PS**
All other majors, **LS**

College of Business

All majors, **SS**

College of Education

Communicative Disorders and Deaf Education, **SS**
Elementary Education (category same as professional depth category)
Health, Physical Education and Recreation, **LS**

(except Parks and Recreation, **SS**)
Instructional Technology (no undergraduate degree)
Psychology, **SS**
Secondary Education (category same as teaching major category)
Special Education (may use any category)

College of Engineering
All majors, **PS**

College of Family Life
Interior Design, **HU**
Nutrition and Food Sciences, **LS**
All other majors, **SS**

College of Humanities, Arts and Social Sciences
Art, **CA**
Communication, **SS**
English, **HU**
History, **HU**
Landscape Architecture and Environmental Planning, **CA**
Languages and Philosophy, **HU**
Liberal Arts and Sciences, **HU**
Music, **CA**
Political Science, **SS**
Sociology, Social Work and Anthropology, **SS**
Theatre Arts, **CA**

College of Natural Resources
Geography, **SS**
Watershed Science, **PS**
All other majors, **LS**

College of Science
Biology, **LS**
All other majors, **PS**

Designation of University Studies Courses

Approved breadth courses for University Studies are listed on pages 51-52. Communications Intensive, Quantitative Intensive, and Depth courses are not listed here, but are designated within the course listings in the *Instructional Units and Programs* section of this catalog and on the University Studies Web Page which can be accessed from the USU Home Page. All University Studies courses are also clearly designated in each semester's *Schedule of Classes*. The designations used for University Studies courses, in both the course listings within this catalog and in the *Schedule of Classes*, are as follows:

Communications Literacy, **CL**
Communications Intensive, **CI**
Quantitative Literacy, **QL**
Quantitative Intensive, **QI**

Breadth Courses
American Institutions, **BAI**
Physical Sciences, **BPS** or **BSC**
Life Sciences, **BLS** or **BSC**
Humanities, **BHU**
Creative Arts, **BCA**
Social Sciences, **BSS**

Depth Courses
Life and Physical Sciences, **DSC**
Humanities and Creative Arts, **DHA**
Social Sciences, **DSS**

University Studies Courses (USU)

The five University Studies courses listed below are taught from an interdisciplinary perspective. Students must complete two of these courses as part of the University Studies Breadth Requirement.

BAI 1300. U.S. Institutions. Provides basic understanding of the history, principles, form of government, and economic system of the United States. Emphasis on ideas and critical thinking, rather than dates, names, and places. (3F,Sp,Su)

BSC 1310. Integrated Science. Focuses on basic scientific concepts and methods of inquiry used by scientists, with emphasis on ideas rather than facts. Investigates science from a broad perspective, showing how various disciplines of science are interrelated. Can be used to meet *either* the Life Sciences *or* the Physical Sciences breadth requirement. (3F,Sp,Su)

BHU 1320. Civilization: Humanities. Provides basic understanding of a broad range of themes, which cut across human history and continue to be important in contemporary society. Covers both Western and non-Western civilization. (3F,Sp,Su)

BCA 1330. Civilization: Creative Arts. Students will explore questions such as: What is Art? How is it judged? How does artistic expression vary across cultures? Course will cover several forms of art, and students will attend concerts, visit galleries, and attend theatrical performances. (3F,Sp,Su)

BSS 1340. Social Systems and Issues. Examines debates in the social sciences about contexts which shape human experience. Compares experiences between life stages, individuals, groups, societies, and/or historical periods. Contrasts different social science disciplines. Considers both non-Western and Western societies. (3F,Sp,Su)

Computer and Information Literacy Examination

As part of the University Studies requirements, all students must pass a Computer and Information Literacy Examination. This exam has six modules: (1) Public Access Networks and Electronic Mail, (2) Information Resources, (3) Operating Systems and Environments; (4) Document Preparation, (5) Data Visualization, Analysis, and Presentation, and (6) Ethics of Computer-Assisted Information Access and Use. It is strongly recommended that the exam be completed prior to the end of the student's first year at USU.

Upon payment of a fee, students can take the examination in a USU student-access computer laboratory. The fee entitles the student to take each module up to three times, and also entitles students who need help to take computer-assisted tutorials which cover exam material. The exam is also offered as part of CS 1010 and BIS 1400. Additional information is available in all USU computing laboratories and on the University Studies Web Page which can be accessed from the USU Home Page (http://www.usu.edu).

Interdepartmental Undergraduate Academic Programs

Applied Technology Education Programs

Director: Maurice G. Thomas

Applied Technology Education Council: Lloyd W. Bartholome, Robert C. Lamb, V. Philip Rasmussen, Gary S. Straquadine, Maurice G. Thomas

Programs

Agricultural Machinery Technology—Department of Agricultural Systems Technology and Education
Office Systems Support—Department of Business Information Systems and Education
Drafting—Department of Industrial Technology and Education
Aeronautics—Department of Industrial Technology and Education
Dairy Herd Management—Department of Animal, Dairy and Veterinary Sciences
Ornamental Horticulture—Department of Plants, Soils, and Biometeorology
Nursing—College of Science (with Weber State University)

Objectives

The primary purpose of applied technology education programs is to prepare people for employment. Utah State University has developed applied technology education programs within role assignments by the State Board of Regents with the support of the State Board of Education. Students earn certificates, diplomas, or Associate of Applied Science degrees in programs of one or two years in length.

Industry advisory committees provide valuable input to insure relevant programs. Follow-up study of graduates is used as one important method to maintain program quality.

Further information concerning these less-than-baccalaureate applied technology education programs may be found in the section *Certificates, Diplomas, and Associate of Applied Science Degrees* on pages 47-48 and in the following departmental sections: Animal, Dairy and Veterinary Sciences, Agricultural Systems Technology and Education, Plants, Soils, and Biometeorology, Business Information Systems and Education, and Industrial Technology and Education.

It is the policy of this institution not to discriminate on the basis of race, color, national origin, sex, or handicap in any applied technology education program or activity.

Area Studies

Program Coordination: College of Humanities, Arts and Social Sciences
Contact: Jennifer W. Tingey, Science/HASS Advising Center, Student Center 304, (435) 797-4029

The Area Studies Certificate program is an interdisciplinary approach to the study of a geographical or thematic subject. The program is available to undergraduate and graduate students. It is not a major and does not lead to a degree. Rather, it is designed to strengthen an academic degree and provides an opportunity for a student to enlarge the scope of the educational experience through an in-depth study of a sector of the world or thematic problem. Where appropriate, courses that apply to the major, minor, or other graduation requirement may also apply to the Area Studies Certificate.

Students may earn the following Area Studies Certificates:

British and Commonwealth Studies
Communicating Across Cultures
International Development
Law and Society
Liberal Arts and Sciences
Religion
Women's Studies

For specific requirements for each of these certificates, see program brochures.

In addition, **a self-designed Area Studies Certificate**, tailored to the student's individual interests, is available. Examples of these are: **Black Studies, Natural Ecosystems, Russian Studies,** and **Latin American Studies**. A student takes a minimum of 24 credits related to the area of study from at least three disciplines, such as economics, natural resources, political science, sociology, literature, history, geography, and philosophy. No more than 12 of the 24 credits may be taken in any one discipline. A GPA of 3.0 must be maintained in courses applied to the certificate.

A student who completes the Area Studies program is awarded a Certificate at the time of graduation. The information is also noted on the graduation program and on the student's transcript. Graduate students are awarded the Certificate at the end of the semester in which they complete the requirements.

For a more detailed description of the requirements for this program, contact the Program Coordinator, Student Center 304.

Asian Studies

Program Coordination: College of Humanities, Arts and Social Sciences
Director: R. Edward Glatfelter, Main 335, (435) 797-1196

The Asian Studies Program is designed to provide students with a rich, interdisciplinary experience leading to a Bachelor of Arts degree or a minor in Asian Studies. The program focuses on East Asia, South Asia, Southeast Asia, and West Asia or the Middle East. Archaeological evidences suggest that humans first occupied Southwest Asia more than half a million years ago, and fully modern humans began living an advanced hunting and

gathering life in Asia some 60,000 years ago. Asia is a collection of some 38 independent nations, some with more than 6,000 years of written history and others only recently becoming independent nations. It is in Asia that the world's major religions originated. Hinduism, Buddhism, Judaism, Christianity, Zoroastrianism, Confucianism, Taoism, Shintoism, and Islam all have origins traced to West, South, and East Asia. A tremendous upsurge of social and economic development in many of the Asian countries deserves closer study and examination to assure harmonious social and economic development between the United States and Asia. The Asian Studies program provides an opportunity for students to develop an insight and knowledge of Asian people, their history and languages, and their political, economic, and cultural lives. Asian languages taught at Utah State University include Japanese, Chinese, Korean, Hindi, Urdu, and Arabic.

A major in Asian Studies requires a minimum of 30 credits approved by the program director. In addition, 16 credits of an Asian language are required for graduation. At least one semester living and studying in an Asian country is recommended for all Asian Studies majors. Residency abroad programs may be arranged through USU affiliated or contact universities or through the International Student Exchange Program (ISEP). Students are encouraged to earn a double major by combining an Asian Studies major with a major in another field.

A minor in Asian Studies requires a minimum of 20 credits approved by the program director. At least 8 credits of an Asian language are recommended.

The program is open to interested Utah State University students having a minimum 2.00 grade point average. A minimum 2.50 GPA in the major or minor courses is required. For more specific information, see the program directors, the Asian Studies Program brochure, or page 82 of this catalog.

Interdisciplinary Studies Major

Program Director: H. Craig Petersen, Provost’s Office, Main 114, (435) 797-1167

The organization of academic departments and their associated degree programs reflects the history and traditions of study in those fields. The Interdisciplinary Studies major is intended to serve the needs of students who want to design a unique individualized academic program, obtain a broadly-based education, and diversify their professional potential. The degree is not intended to replace existing majors or curricula. Rather, it is designed to provide the small number of students whose degree needs cannot be met with other majors with a program which is less restrictive and more responsive to their individual plans and interests. Students who complete their programs will receive the Bachelor of Science or (if they meet the language requirement) the Bachelor of Arts degree. The degree cannot be used as part of a dual/double major. For further information about the Interdisciplinary Studies Major, see pages 262-263 in this catalog.

International Studies Major and Minor

Program Director: H. Craig Petersen, Provost’s Office, Main 114, (435) 797-1167

The major and minor in International Studies provide educational opportunities enabling students to develop and enhance their international competencies. Specifically, these programs enhance the student's knowledge of the history, culture, and institutions of other countries; cultivate development of language and intercultural skills; develop understanding of global problems and circumstances; and expand the student's capacity to make informed judgements regarding complex international issues. Along with completion of coursework and a senior project, International Studies majors are required to spend at least eight weeks living in a foreign country. For detailed description of requirements for the International Studies Major and Minor, see pages 263-264 in this catalog.

Special Certificate Programs

Special Certificates may be awarded as supplements to degree programs when authorized by the University. Currently Special Certificates are granted to recognize areas of emphasis and interdisciplinary concentrations. These include the Area Studies Certificate; the International Relations Certificate; and the Music Certificate in Pedagogy of Piano, Organ, or Guitar, all coordinated in the College of Humanities, Arts and Social Sciences. The Gerontology Certificate is awarded in the College of Family Life.

Women's Studies

Program Coordination: College of Humanities, Arts and Social Sciences

Contact: Brenda Cooper, director, Animal Science 319C, (435) 797-3253

Women's Studies at Utah State University is a multidisciplinary program focusing on the role of gender in the everyday experiences of women and men. Students are provided with opportunities to examine the diverse experiences, perspectives, and contributions of women in the past, present, and future, both nationally and internationally. Specific courses examine the processes of gender role socialization, and the resulting cultural beliefs and stereotyped images of women from a variety of disciplines. As a result, students gain appreciation for the role of gender and its practical implications in their basic life experiences, thus preparing them to understand current and future changes in the roles of women.

Each semester, Women's Studies courses are taught by faculty members from several areas throughout the University, including Anthropology, Communication, English, Health and Physical Education, History, Natural Resources, Political Science, Psychology, Special Education, and Sociology. Throughout the year, several special topics courses are offered, and many courses also offer Honors and graduate sections. Internship hours are available for work related to women's issues. To meet student needs, new courses are continually developed and offered.

Students may enroll in individual courses or apply coursework toward either a minor in Women's Studies or an Area Studies certificate.

Further information may be obtained from the director (Animal Science 319C) or the Science/HASS Advising Center (Student Center 304).

Graduate General Information

School of Graduate Studies

James P. Shaver
Dean, School of Graduate Studies
tel. (435) 797-1189

Graduate programs at USU are supervised by the dean of the School of Graduate Studies, assisted by the Graduate Council. The council consists of the dean, a faculty representative from each of the eight colleges of the University, a representative from the Faculty Senate, the dean of Learning Resources, and two graduate students. Policies and regulations for graduate work are established by the Graduate Council with the approval of the Faculty Senate.

USU has awarded master of science degrees since 1914 and doctoral degrees since 1950. The School of Graduate Studies was formally organized in 1945. Forty-three of the University's 44 departments participate in graduate degree programs, including several interdepartmental programs. Included are 100 master's programs, 34 doctoral programs, 3 educational specialist programs, and 2 engineer degrees. Nationally and internationally known scholars and research units participate in and support graduate studies at USU.

The School of Graduate Studies holds memberships in the Council of Graduate Schools in the United States and the Western Association of Graduate Schools.

Graduate Calendar

For information on registration and dropping and adding classes, consult the current *Schedule of Classes*. For further information on degree completion dates, consult the School of Graduate Studies. All dates are subject to change without notice.

Fall Semester 1998

August 31	Classes begin
September 7	Holiday (Labor Day)
November 25-27	Thanksgiving break
December 4	Program of Study for master's/doctorate and *Application for Candidacy* forms for doctorate must be submitted to the School of Graduate Studies (approved supervisory committee form should already be on file) to meet deadline for 1999 Commencement program.
December 11	Last day of classes
December 14-17	Final examinations
December 17	Last day to complete degree requirements for fall semester

Spring Semester 1999

December 4	Program of Study for master's/doctorate and *Application for Candidacy* forms for doctorate must be submitted to the School of Graduate Studies (approved supervisory committee form should already be on file) to meet deadline for 1999 Commencement program.
January 11	Classes begin
January 18	Holiday (Human Rights Day)
February 15	Holiday (Presidents' Day)
February 19*	Committee-approved thesis/dissertation must be **submitted** to the School of Graduate Studies for review.
March 15-19	Spring break
April 9*	All graduation forms must be completed and submitted to the School of Graduate Studies along with proof of payment of all fees.
April 9*	Thesis/dissertation must be **approved** by the thesis coordinator.
April 9*	Letter of completion from department head (nonthesis programs) must be on file in the School of Graduate Studies Office.
April 9*	Incomplete grades must be changed and posted on transcript.
April 23*	Two copies of the approved thesis/dissertation must be submitted to the School of Graduate Studies for binding.
April 30	Last day of classes
May 3-7	Final examinations
May 7	Last day to complete degree requirements for spring semester

May 7	Master's and Doctoral Hooding Ceremony
May 8	Commencement

Summer Semester 1999

May 10 -June 4	Early session
May 10	First day of classes
May 31	Holiday (Memorial Day)
June 7-11	First workshop week
June 14	Regular session begins (8 weeks)
July 5	Holiday (Independence Day)
July 23	Holiday (Pioneer Day)
August 6	Last day of classes
August 9-13	Second workshop week
August 13	Last day to complete degree requirements for summer semester

Fall Semester 1999

August 30	Classes begin
September 6	Holiday (Labor Day)
November 25-26	Thanksgiving break
December 3	Program of Study for master's/doctorate and *Application for Candidacy* forms for doctorate must be submitted to the School of Graduate Studies (approved supervisory committee form should already be on file) to meet deadline for 2000 Commencement program.
December 10	Last day of classes
December 13-17	Final examinations
December 17	Last day to complete degree requirements for fall semester

Spring Semester 2000

December 3	Program of Study for master's/doctorate and *Application for Candidacy* forms for doctorate must be submitted to the School of Graduate Studies (approved supervisory committee form should already be on file) to meet deadline for 2000 Commencement program.
January 10	Classes begin
January 17	Holiday (Human Rights Day)
February 18**	Committee-approved thesis/dissertation must be **submitted** to the School of Graduate Studies for review.
February 14	Holiday (Presidents' Day)
March 13-17	Spring break
April 7**	All graduation forms must be completed and submitted to the School of Graduate Studies along with proof of payment of all fees.
April 7**	Thesis/dissertation must be **approved** by the thesis coordinator.
April 7**	Letter of completion from department head (nonthesis programs) must be on file in the School of Graduate Studies Office.
April 7**	Incomplete grades must be changed and posted on transcript.
April 21**	Two copies of the approved thesis/dissertation must be submitted to the School of Graduate Studies for binding.
April 28	Last day of classes
May 1-5	Final examinations
May 5	Last day to complete degree requirements for spring semester
May 5	Hooding
May 6	Commencement

Summer Semester 2000

May 8-June 2	Early session
May 8	First day of classes
May 29	Holiday (Memorial Day)
June 5-9	First workshop week
June 12	Regular session begins (8 weeks)
July 4	Holiday (Independence Day)
July 24	Holiday (Pioneer Day)
August 4	Last day of classes
August 7-11	Second workshop week
August 11	Last day to complete degree requirements for summer semester

*Deadline for inclusion in the 1999 Commencement program.

**Deadline for inclusion in the 2000 Commencement program.

Graduate Degrees and Majors

Utah State University offers the following graduate degrees:

Master of Accounting (MAcc)
Master of Arts (MA)
Master of Business Administration (MBA)
Master of Community Economic Development (MCED)
Master of Education (MEd)
Master of Engineering (ME)
Master of Engineering Science (MES)
Master of Fine Arts (MFA)
Master of Forestry (MF)
Master of Landscape Architecture (MLA)
Master of Mathematics (MMath)
Master of Natural Resources (MNR)
Master of Science (MS)
Master of Second Language Teaching (MSLT)
Master of Social Sciences (MSS)
Civil Engineer (CE)
Educational Specialist (EdS)
Electrical Engineer (EE)
Doctor of Education (EdD)
Doctor of Philosophy (PhD)

Following is a list of the academic areas, or majors, within which degrees are offered and the degree(s) for each:

Accounting . . . . . MAcc
Agricultural Economics . . . . . MA, MS
Agricultural Systems Technology . . . . . MA, MS
American Studies. . . . . MA, MS
Animal Science. . . . . MA, MS, PhD
Aquatic Ecology . . . . . MS, PhD
Art . . . . . MA, MFA
Biochemistry. . . . . MS, PhD
Biological & Agricultural Engineering . . . . . MS, PhD
Biology. . . . . MS, PhD
Biology Ecology . . . . . MS, PhD
Biometeorology . . . . . MA, MS, PhD
Bioveterinary Science . . . . . MA, MS
Business Administration. . . . . MBA
Business Information Systems and Education . . . . . MS
Chemistry . . . . . MS, PhD
Civil and Environmental Engineering . . . ME, MS, CE, PhD
Communication . . . . . MA, MS
Communicative Disorders . . . . . MEd, MA, MS, EdS
Community Economic Development . . . . . MCED
Computer Science . . . . . MS
Dairy Science. . . . . MA, MS
Economics . . . . . MA, MS, PhD
Education . . . . . EdD[1], PhD[1]
Electrical Engineering. . . . . ME, MES, MS, EE, PhD
Elementary Education . . . . . MEd, MA, MS
English . . . . . MA, MS
Family and Human Development . . . . . MS
Family Life . . . . . PhD[1]
Fisheries and Wildlife . . . . . MS, PhD
Fisheries and Wildlife Ecology . . . . . MS, PhD
Forest Ecology . . . . . MS, PhD
Forest Management . . . . . MF
Forestry . . . . . MF, MS, PhD
Geography . . . . . MA, MS
Geology . . . . . MS
Geology Ecology. . . . . MS
Health, Physical Education and Recreation . . . . . MEd, MS
History . . . . . MA, MS
Human Environments . . . . . MS
Industrial Technology . . . . . MS
Instructional Technology . . . . . MEd, MS, EdS, PhD
Irrigation Engineering . . . . . MS, PhD
Landscape Architecture. . . . . MLA, MS
Mathematical Sciences . . . . . PhD
Mathematics . . . . . MS, MMath
Mechanical Engineering . . . . . ME, MS, PhD
Natural Resources. . . . . MNR[1]
Nutrition and Food Sciences . . . . . MA, MS, PhD
Physical Ecology. . . . . MS, PhD
Physics . . . . . MS, PhD
Plant Ecology . . . . . MS, PhD
Plant Science . . . . . MA, MS, PhD
Political Science . . . . . MA, MS
Psychology . . . . . MA, MS, PhD
Range Ecology . . . . . MS, PhD
Range Science . . . . . MS, PhD
Recreation Resource Management. . . . . MS, PhD
Secondary Education . . . . . MEd, MA, MS
Social Sciences . . . . . MSS[1]
Sociology . . . . . MA, MS, PhD
Soil Science . . . . . MA, MS, PhD
Special Education . . . . . MEd, MS, EdS, PhD
Statistics . . . . . MS
Theatre Arts . . . . . MA, MFA
Town and Regional Planning . . . . . MS
Toxicology . . . . . MS[1], PhD[1]
Watershed Science . . . . . MS[1], PhD[1]
Wildlife Ecology . . . . . MS, PhD

[1]Interdisciplinary degree program

Graduate Financial Assistance

Applications for assistantships, fellowships, and other financial aid should be made through departmental offices. In addition to the information in this section, information on scholarships and fellowships for graduate students is included in the *Financial Aid and Scholarship Information* section (pages 21-38).

Along with most graduate schools in the United States, USU is a party to a resolution of the Council of Graduate Schools that establishes April 15 as the deadline for acceptance of offers of financial assistance. If a student accepts an offer before April 15 and then wishes to withdraw, a resignation of the appointment may be submitted in writing at any time through April 15. However, after April 15 a student is not to accept another offer without first obtaining a written release from the institution to which a commitment has been made.

Graduate Assistantships

Teaching, research, and other graduate assistantships are available in most of the departments of the University. A full-time assistantship is 20 hours per week. In the interest of timely degree completion, graduate students are generally employed by the University for *no more than* 20 hours per week. Employment for more than 20 hours per week must be approved by the student's adviser and degree-program department head. Graduate assistants must be full-time, matriculated students (see *Student Classifications* section, pages 61-62) with a GPA of 3.0 or higher. Graduate assistants may register for a maximum of 12 credits per semester. However, a research assistant whose assistantship involves his or her thesis or dissertation research may register for additional credits, as explained below.

Teaching Assistantships/Graduate Instructors. Graduate students may be teaching assistants or graduate instructors in departments. Teaching loads vary up to a maximum of 20 hours per week and stipends vary depending on the department and the teaching load.

International students may be considered for teaching assistantships if they demonstrate adequate proficiency in English communication, as determined by Utah State University's Intensive English Language Institute, and have participated in the required workshop.

All teaching assistants and graduate instructors are required to participate in a training workshop sponsored by the School of Graduate Studies prior to beginning their assistantships. The workshops help students gain the techniques and skills to be effective instructors in the university environment. The workshop for international students also aids students in understanding the American university culture and in improving communication. When a teaching assistant workshop has been successfully completed, it will be added to the student's transcript with one credit. However, this credit cannot be applied toward a graduate degree program.

Research Assistantships. As for teaching assistants, the stipends and workloads for research assistants vary, with a maximum workload of 20 hours per week. Students conducting research that will be used for their thesis or dissertation may register for 4 research or thesis credits above the 12-credit limit.

Federal College Work-Study Assistantships. Graduate students who are eligible for work-study support apply for these competitive assistantships through departments and the Financial Aid Office.

Waiver of the Nonresident Portion of the Tuition Fee. A nonresident student who holds a graduate assistantship may be awarded a waiver of the nonresident portion of tuition for courses in the student's degree program. The department head must submit a waiver request to the graduate dean for approval at least five days before the last day for students to register or add classes for the semester for which the waiver is requested. Waivers for the academic year may be submitted before fall semester. A tuition waiver must be used before the last day for registering or adding classes in the semester for which it was awarded. Waivers *cannot* be used to audit classes or for coursework below the 5000 level, *unless* the course is on the student's Program of Study or required by the student's supervisory committee, as indicated by a letter from the committee chair.

Western Regional Graduate Programs (WRGP)

Residents of participating states may enroll in graduate programs approved as Western Regional Graduate Programs (WRGP) by the Western Interstate Commission for Higher Education (WICHE) without paying nonresident tuition. USU's WRGP degrees are the MS and PhD in Agricultural Meteorology, Toxicology, and Watershed Science; and the MS in Atmospheric and Space Sciences. Information is available in the School of Graduate Studies.

Fellowships

Fellowships and scholarships awarded by the School of Graduate Studies are described below. Awardees must be full-time, matriculated students enrolled in approved graduate-level coursework. Application for these, as well as for departmental fellowships and awards, is made through the departments, except for the Martin Luther King Fellowship (see below). April 1 is the deadline for departmental nominations of fellowship and scholarship recipients for the next academic year.

Presidential Fellowships include a $12,000 stipend for the academic year and a waiver of the nonresident portion of tuition. Criteria include a 3.70 GPA and quantitative and verbal GRE scores at the 80th percentile or above.

Vice President for Research Fellowships include a $12,000 stipend for the academic year and waiver of the nonresident portion of tuition. Criteria are the same as for the Presidential Fellowships. In addition, the student must be in a research degree program that includes a master's thesis or doctoral dissertation.

University Graduate Fellowships also include a $12,000 stipend for the academic year and a waiver of the nonresident portion of tuition. Criteria are the same as for Presidential Fellowships.

Martin Luther King Fellowships are available to African-American students. The fellowship is typically for $2,000 and includes a waiver of the nonresident portion of tuition. The department usually also awards an assistantship or other support,

the amount of which varies. Application for this fellowship is made through the School of Graduate Studies.

Scholarships

Resident Tuition Scholarships. Scholarships covering the resident portion of tuition are available each semester on a competitive basis through the departments. The criteria are the same as for the Presidential Fellowships. Awardees must be full-time matriculated students and must maintain a 3.0 or higher GPA.

Seely-Hinckley Scholarships are awarded each year to two needy graduate students with superior academic records. College deans nominate by April 1 top scholars as candidates for the following school year.

Other Financial Assistance

Many students who do not receive assistantships or fellowships receive financial assistance by working for departments or other campus units. Graduate students are generally not employed by the University for more than 20 hours per week. Employment beyond 20 hours per week must be approved by the student's adviser and degree-program department head.

Graduate students may apply for Federal Stafford Loans, Federal Perkins Loans, Federal Supplemental Loans for Students (SLS), Emergency Loans, and Federal College Work-Study through the Financial Aid Office. More information can be found in the *Financial Aid and Scholarship Information* section of this catalog, page 21, or by contacting:

Financial Aid Office
Taggart Student Center 106
Utah State University
1800 Old Main Hill
Logan UT 84322-1800
tel. (435) 797-0173

For information about **GI Bill Benefits**, contact:

Office of Veterans Affairs
Taggart Student Center 225
Utah State University
1600 Old Main Hill
Logan UT 84322-1600
tel. (435) 797-1102

Graduate Admission Procedures

School of Graduate Studies
Utah State University
0900 Old Main Hill
Logan UT 84322-0900
tel. (435) 797-1189

Requirements

Application-for-admission forms are obtained from and returned to the School of Graduate Studies. The form must be accompanied by a nonrefundable application fee of $40 for U.S. citizens and international students. **Note: Fees must be paid before applications will be evaluated.**

Bachelor's Degree. A bachelor's degree from an accredited college or university is required. A master's degree may be required for admission to a doctoral program.

Grade Point Average. A minimum 3.0 GPA for the last 60 semester credits is required.

Transcripts. Each previously attended college and/or university, including USU, must be listed on the application form, and the applicant must have two official transcripts from each institution (except USU) sent directly to the USU School of Graduate Studies. Transcripts accumulated on one record are not acceptable. Transcripts must be submitted for **all** coursework above the high-school level and **all** prior degrees. Transcripts not in English must be accompanied by a notarized translation.

Transcripts submitted as application credentials become the property of the School of Graduate Studies and will not be copied for or returned to the applicant.

Admissions Tests. An admission test is required of all applicants. Scores at or above the 40th percentile are required by the School of Graduate Studies. Departments may set higher criteria. Most applicants must take the Graduate Record Examination (GRE) general test (minimum of 40th percentile on the verbal and quantitative tests). Those applying to Physics are also required to take the GRE subject test for physics. Some departments will accept the Miller Analogies Test (MAT) for master's degree applications. Applicants to the Master of Business Administration, the MS in Business Information Systems and Education, and Master of Accounting programs are required to take the Graduate Management Admission Test (GMAT). Registration forms for the GRE and the GMAT are available at the School of Graduate Studies. Applicants should request that their test report be sent directly to the School of Graduate Studies. The report must be received before an application is considered complete.

Recommendation Letters. Three letters of recommendation are required; each must address the applicant's potential for success in the proposed graduate degree program. At least two of the letters must come from persons from whom the applicant has taken academic coursework. The letters must be sent directly to the School of Graduate Studies by the writers. The forms for letters of recommendation (included in the application packet) should be used.

International Applicants. International applicants from non-English-speaking countries must demonstrate competency in the English language. A minimum score of 550 on the Test of English as a Foreign Language (TOEFL), which is administered throughout the world, satisfies that requirement, unless the student's department requires a higher score. If an international applicant has a degree from a university in an English-speaking country, the TOEFL is not required.

An applicant who is admitted with a TOEFL score below 550 or below a departmentally required minimum, or who has not obtained a degree in an English-speaking country, must take the English Language Placement Test given by the Intensive English Language Institute (IELI) at USU. The test must be taken before a student is allowed to register. The results of the exam are used to place students into one of three categories: (1) full-time study of English in the Intensive English Language Institute; (2) a combination of English-language study and academic study, if approved by the IELI director, the student's adviser, and the graduate dean; or (3) full-time academic studies. Students placed in the Intensive English Program must remain in the program until the required English proficiency is attained. Those in category (1) are not allowed to register for non-IELI classes.

International students must also submit an I-20 application form, a financial certificate, and a financial guarantee. Because of immigration regulations, international students cannot be admitted to provisional matriculation.

Application Deadlines. Completed application forms, transcripts, letters of recommendation, test scores, and the application fee should be submitted on or before the following dates (some departments have different deadlines; see departmental descriptions). It may not be possible to process applications for the following semester when they are submitted late.

March 15 for summer semester
June 15 for fall semester
October 15 for spring semester

As soon as an application is complete, a recommendation is made by the appropriate department to the graduate dean, who must approve all admissions. No notification of acceptance or rejection other than that from the graduate dean is official.

Graduate General Regulations

Each graduate student is responsible to be knowledgeable about the policies, regulations, and procedures of the School of Graduate Studies and of his or her department or program, and to see that they are followed and that the timelines are met. The policies and regulations stated in this catalog and in departmental handbooks may be changed between publication dates, and students are responsible to obtain up-to-date information.

Time Limit

A master's degree must be completed within six years of matriculation. A doctorate must be completed within eight years of matriculation.

Coursework that is more than eight years old may not be used for a graduate degree. Work experience cannot be substituted for out-of-date coursework. However, if permitted by the departmental or interdepartmental degree program policy, a supervisory committee may allow revalidation through testing, following a plan developed by the supervisory committee and approved by the dean of the School of Graduate Studies. The results must be verified in writing to the graduate dean by the student's major professor or other person(s) responsible for the testing.

Graduate credits from another institution that will exceed the eight-year limit at the time of degree completion may be transferred to a USU graduate degree only if the student's supervisory committee provides a justification acceptable to the graduate dean. Then, the revalidation procedures described above apply.

Student Classifications

A **matriculated graduate student** has been accepted by a department, with the concurrence of the dean of the School of Graduate Studies, to an approved graduate degree program and has enrolled at the University. A student may be accepted on a **provisional** matriculation basis when (1) information, such as GRE scores, is yet to be received in the School of Graduate Studies Office, or (2) when a missing prerequisite or academic deficiency must be remedied. The conditions and time limit for meeting them must be specified to the student in writing at the time of admission. If the conditions are not met as specified, the student's participation in the degree program will be terminated. International students cannot be admitted on provisional status.

A **full-time matriculated graduate student** must be one of the following:

1. Registered for 9 or more graduate credits; or

2. Registered for 6 or more graduate credits if employed as a graduate assistant for 15 hours per week or more; or

3. Registered for 3 graduate credits with all required coursework completed and only the research component of the degree remaining (the student's Program of Study must have been submitted to the School of Graduate Studies Office and the major professor must have verified by letter to the School of Graduate Studies Office that the student has only the research component remaining); or

4. Registered for at least 3 graduate credits during the semester of the final thesis/dissertation defense or, in a nonthesis degree program, the last semester of coursework required on the student's Program of Study.

Registration for 1 graduate credit during the semester of approval of a thesis or dissertation or the semester of completion of requirements in a nonthesis master's degree program does not qualify a student for full-time status.

A **matriculated-probationary graduate student** has been placed on warned status because of inadequate progress in his or her degree program. The conditions to be met and the time limit for meeting them must be specified to the student in writing at the time he or she is placed on probation. If the conditions are not met as specified, the student's participation in the degree program will be terminated.

Graduate assistants and fellowship recipients must be full-time matriculated students with a GPA of 3.0 or above, and must be registered each semester of the assistantship or fellowship, including summer.

A **nonmatriculated postbaccalaureate student** holds a bachelor's degree, is enrolled for USU coursework, but has not been accepted to a graduate degree program. These students should apply to the undergraduate Admissions Office, Utah State University, 1600 Old Main Hill, Logan UT 84322-1600, tel. (435) 797-1096. A **maximum of 12 semester credits** earned as a nonmatriculated, postbaccalaureate student **may be used** in a graduate degree program, but only **if approved** by the student's supervisory committee.

An international student with a bachelor's degree who wants to take graduate-level coursework at USU, but not be in a graduate degree program, must apply through the undergraduate Admissions Office, Utah State University, 1600 Old Main Hill, Logan UT 84322-1600, tel. (435) 797-1096. For other information about the University, he or she can contact the International Students and Scholars Office, Utah State University, 0140 Old Main Hill, Logan UT 84322-0140, tel. (435) 797-1124.

Split Form Policy

A **transitional student** is a Utah State University undergraduate who has received permission to file a Split Form in order to register for graduate courses. Without a Split Form, the instructor's permission is required. For the Split Form to be approved, the student must be within 30 semester credits of completing bachelor's degree requirements, have filed an Application for Graduation in the Graduation Office, have a cumulative undergraduate GPA of 3.0 or higher, and have applied for admission to the School of Graduate Studies. In accordance with School of Graduate Studies admission policy (see page 60), a transitional student will not be admitted to the School of Graduate Studies until his/her bachelor's degree is completed. A maximum of 9 semester credits may be split out, and a total of not more than 12 Split Form and nonmatriculated semester credits may be used in a graduate degree program, but only if approved by the student's supervisory committee.

A Split Form, which must include one or more undergraduate courses from the student's Application for Graduation, should be filed in the School of Graduate Studies Office, along with a copy of the Application for Graduation, before grades are posted for the semester requested to be split. A Split Form cannot be processed after the bachelor's degree has been closed out. The form must be signed by the undergraduate adviser and the graduate department head or departmental graduate program chair/coordinator before it is submitted to the School of Graduate Studies Office. If approved by the dean of the School of Graduate Studies, the form will be processed and forwarded to the Graduation Office. Approval of a Split Form does not guarantee acceptance to the School of Graduate Studies.

Course-Level Numbering and Acceptability

7000-7990 are doctorate-level courses. With supervisory committee and instructor approval, they may be used in a master's program.

6000-6990 are master's-level courses. With supervisory committee approval, they may be used in a doctoral program.

5000-5990 are advanced, upper-division courses and may be used in a graduate program if approved by the supervisory committee.

3000-4990 are junior/senior, upper-division undergraduate courses. Up to 3 semester credits of coursework at this level **may be used for a master's degree**, upon recommendation by the student's supervisory committee and approval by the graduate dean. To be approved, such courses must be outside the student's graduate-degree field and must not be required by the graduate-degree department for a related undergraduate degree. Courses which students entering the graduate program are expected to have taken as undergraduates and prerequisites for courses in a master's degree program are not acceptable.

No more than 15 semester credits of 3000-5990 coursework may be used for a graduate degree, except for a doctorate without a master's degree, for which a total of 21 undergraduate semester credits, including 3 semester credits of 3000-4990 coursework, may be used.

2990 and below are lower-division courses and are not acceptable for graduate degree programs of study.

Audited courses may not be used for a degree program or toward status as a full-time student. Credits in the following areas are not acceptable: language, continuing graduate advisement, individual home study, military science, and courses numbered below 3000. No more than 12 workshop credits may be applied to a master's degree.

Minimum Grades and Credit Acceptability

Graduate students are required to maintain at least a 3.0 GPA for degree-program courses. Grades below *C* will not be accepted. Some departments do not accept *C* grades.

P-Grade Policy. *P* (Pass) will be accepted only for seminars, special problems, interdisciplinary workshops, thesis or dissertation research, and continuing graduate advisement. Credits for a course with a *P* grade cannot be transferred from another university.

Correspondence Course Credits. Continuing Education correspondence (independent study) courses are not accepted for graduate degrees.

Credit by Special Examination. Credit earned by special examination cannot be used to satisfy the course requirements for a graduate degree or to meet the residency requirement.

Transfer Credits

A student's supervisory committee may recommend transfer of **graduate** credits earned at another accredited institution. The credits must not have been used for another degree. Only 12 semester credits earned before matriculation at USU may be

transferred. Credits with *P* grades cannot be transferred. Transfer credits cannot replace required residency credit. Transfer credits are subject to approval of the supervisory committee and the dean of the School of Graduate Studies (see *Time Limit*, page 61).

Rights in Inventions

It is the student's responsibility to be aware of University policy in regard to rights in inventions. (Information is available in the office of the Vice President for Research.)

Research Approval

All University research involving human subjects, use of animals, radiation or radiological materials, or biohazardous materials must be reviewed and approved by the appropriate University committee(s) **before the research is started**. Graduate students are, with the assistance of their advisers, responsible for obtaining the necessary approval for their research. Verification of approval must be submitted to the School of Graduate Studies Office before the student's master's Program of Study or doctoral Application for Candidacy can be approved. For further information, contact the School of Graduate Studies Office or the Office of the Vice President for Research.

Continuous Graduate Registration

Graduate students must be registered for a minimum of 3 graduate credits every semester except summer (and also summer, if employed as a graduate assistant that semester) until completion of all degree requirements, except, in some cases, the semester of final thesis or dissertation approval (see below). More than 3 credits of continuous registration may be required by a department or college. Continuous registration may be for courses, seminars, independent study, research credit, or 6990 or 7990 (Continuing Graduate Advisement). The continuous registration requirement goes into effect the semester a student matriculates in the School of Graduate Studies.

A graduate student who is not using University facilities or faculty time may meet the continuous registration requirement by paying the **Continuous Registration Fee** of $15 per semester (not necessary for summer semester). This alternative requires a written request from the department head, including verification that the student is not using University facilities and/or faculty time. International students are usually not eligible because of immigration regulations.

The semester a student defends (or redefends) a thesis, Plan B paper, or dissertation or takes final oral examinations, he or she must be registered for at least 3 credits. If the thesis or dissertation is not approved by the graduate dean before the last day of the next semester following a thesis or dissertation defense, the student must register for at least 1 credit the semester of completion and pay the Continuous Registration fee for any intervening semesters for which he or she did not register. If a nonthesis student does not complete degree requirements during the final semester of required coursework, the student must register for at least 1 credit the semester of completion and pay the Continuous Registration Fee for any intervening semesters for which he or she did not register. If working with faculty involves more than routine submission of the thesis or dissertation to the thesis coordinator, registration for 3 or more credits is required.

Leave of Absence

A leave of absence, during which continuous registration is not required, may be granted under the following conditions:

1. Illness, required military service, and other extenuating circumstances acceptable to the department head and the graduate dean.

2. Lack of availability of courses in a planned Extension program.

3. Participation in a planned program based primarily on summer semester courses.

For either 2 or 3, the student must have an approved Program of Study on file in the School of Graduate Studies Office before a leave will be granted.

A leave of absence must be approved by the graduate dean, upon written recommendation of the department head. A leave of absence may be the basis for extending the time limit to complete a degree, but not to extend the time limit for course validity.

Notice of Failure to Register and Reactivation Procedures

A student who does not maintain continuous registration will be notified and a copy of the notification will be sent to the department. If, after notice, the student fails to register, the department will be notified and the student's records will be put on inactive status. On the recommendation of the department, the student's file may be reactivated, if the time limit for the degree has not expired. The student will be required to pay the Continuous Registration Fees or register for the semesters missed, as appropriate.

Low-Scholarship Notification

Students whose grade point average (GPA) is below 3.0 any semester will be notified. The status of a student whose GPA falls below 3.0 for two consecutive semesters may be changed to probationary status or his or her graduate program may be terminated. In the latter case, reapplication is required to regain matriculation. Should a student holding a University appointment as a teaching or research assistant or fellow be changed to probationary status, the assistantship or fellowship will be terminated. Until a Program of Study is submitted to the School of Graduate Studies Office, computation of the GPA will be based on the postbaccalaureate courses on the student's USU transcript. Once a Program of Study, approved by the student's supervisory committee and department head, is in the School of Graduate Studies file, the courses on it will be used to compute GPA. Departments may have more restrictive scholarship policies.

Monitoring of Progress

The student's department and the School of Graduate Studies monitor the progress of graduate students. For continued participation in a graduate program, a student must complete requirements in a timely manner with scholarship and independence. In reviewing a student's progress, several factors will be considered, including demonstrated ability to develop a thesis proposal, independence in the conduct of research, performance on comprehensive examinations, GPA, and special program requirements. Satisfactory progress also involves maintaining the standards of professional ethics and integrity expected in the student's discipline.

Academic Nepotism

A faculty member is not to participate in admission or

graduate-assistant employment decisions, or serve as major professor or on the supervisory committee, of a relative, including a person with whom he or she has or has had an amorous relationship. Graduate students may enroll in classes taught by a relative only under special conditions. For information, contact the department head or the School of Graduate Studies office.

Matriculation of Faculty

It is the policy of USU not to grant advanced degrees to its own faculty, except under unusual circumstances (see Faculty Policy 404.1.4).

Academic Honesty and Research Misconduct

Maintaining the highest standards of academic honesty and research ethics is especially important at the graduate level, where students are expected to do original, scholarly work in preparation for future professional and academic roles. Academic dishonesty is defined in the *Code of Policies and Procedures for Students at Utah State University* (July 12, 1993) Article V, Section 3, Paragraphs a, b, and c (see page 20 of this catalog) to include cheating, falsification of information, and plagiarism.

Violations of the above policy will subject the offender to the University disciplinary procedures as outlined in Article VI, Section 1 of the student *Code*, with the penalties or disciplinary measures to include one or more of the following:

1. **Probation.** Continued attendance at the University is predicated upon the student satisfying certain requirements as specified by the University. Probation is for a designated period of time and includes the probability of more severe disciplinary penalties if the student does not comply with the specified requirements or is found to be violating any University regulations during the probationary period.

2. **Suspension.** Temporary dismissal from the University for a specified time, after which the student is eligible to return. Conditions for readmission may be specified.

3. **Expulsion.** Permanent dismissal from the University.

4. **Denial or revocation of a degree.**

Research is a vital part of the education of most graduate students, and appropriate scientific and research conduct is expected. An allegation of scientific misconduct involving funded research is handled through the Office of the Vice President for Research. If the research is nonfunded, the allegation is handled following the *Code of Policies and Procedures for Students at Utah State University*.

Research misconduct may be determined during a student's program or after the program is completed. If a student is found guilty of research fraud, the penalty may include, in addition to any listed above, correction and reanalysis of data and/or rewriting of the thesis or dissertation, with resubmission and redefense of the thesis or dissertation, and/or loss of financial assistance.

Appeals Procedure

Graduate students with grievances relating to academic matters may appeal to the dean of the School of Graduate Studies following the steps and procedures in the *Code of Policies and Procedures for Students at Utah State University*.

Graduate Degree Requirements

Each graduate student is responsible to be aware of degree requirements and to work with his or her major professor, supervisory committee, and department head to meet the requirements and specific deadlines.

Master's Degrees

When a student is accepted to a master's degree program, the department head appoints a temporary adviser, who may become the student's major professor. In most master's degree programs, a supervisory committee will be established for each student. During the first semester following matriculation, the student should meet with the department head to discuss the appointment of a supervisory committee. A completed **Supervisory Committee** form should be submitted by the department head to the dean of the School of Graduate Studies for final approval by the end of the student's first semester. Committee changes are not to be made during the six weeks prior to the final defense.

A master's degree supervisory committee must include at least three faculty members who are approved by the department head and the dean of the School of Graduate Studies. At least one member must represent the student's area of specialization, and at least one must be from outside the specialization area. Adjunct faculty can be members with the approval of the dean of the School of Graduate Studies.

Within School of Graduate Studies and departmental requirements, the supervisory committee determines the courses for the student's Program of Study; conducts departmental qualifying examinations (if required); supervises the student's thesis research, Plan B paper, or project; and conducts the defense or final examination. The defense or final examination must be scheduled through the School of Graduate Studies. The major professor, who serves as the chairperson of the committee, usually directs the thesis, paper, or other degree project.

Three copies of a **Program of Study** form, one of which must be the original with signatures in ink, should be submitted to the Graduate School Office by the student by the end of the second semester following matriculation. The Program of Study must be submitted at least two months prior to the final examination or, for Plan C programs, completion of coursework.

Plan A. The Plan A option for a master's degree requires preparation of a thesis. From 6-15 semester credits of thesis research are required. The semesters during which a student registers for thesis credit should correspond as closely as possible to the semesters in which the thesis work is done and faculty supervision is provided.

The thesis for a Plan A master's degree is to be a contribution to the field of knowledge based on the student's own research or a treatment and presentation of known subject matter from a new point of view. The student and major professor should decide upon a problem or subject for the thesis study by the end of the student's first semester of graduate study.

A **Thesis Proposal**, signed by the entire committee, should be submitted by the student to the School of Graduate Studies along with the **Program of Study** form.

The supervisory committee must verify the writing competency of all Plan A master's students. The method of verification is determined by the committee and/or department. The committee certifies the student's writing competency on the Program of Study form.

The student and all committee members are required to sign a **Data and Copyright** form and a **Plans for Publication** form. The forms are given to the student with his or her copy of the approved Supervisory Committee form and must be submitted to the Graduate School Office **prior to the final defense**.

Plan B. The Plan B option requires the production of a paper or a creative work of art. At least 2 credits of thesis research are required, but no more than 3 credits of thesis credit can be included on the Program of Study.

The Plan B paper is usually a review of literature, with conclusions drawn after conceptualizing an area of inquiry, planning a systematic search, and analyzing and critiquing the acquired information. The summary and conclusions developed should enhance knowledge in the discipline.

Plan B papers and reports should follow the same format specifications as theses and dissertations and are expected to reflect equivalent scholarship standards, even though they may be less intensive and not demand the originality of a Plan A thesis. Plan B papers are defended, but are not reviewed by the School of Graduate Studies thesis coordinator or signed by the graduate dean. Plan B papers must be submitted to the library to be microfiched.

Plan C. A master's degree option with no thesis or Plan B paper is available in some programs. A departmentally approved program that includes a culminating creative or integrative experience must be filed in the School of Graduate Studies. Generally, a course or seminar on research methods is required, but thesis credits are not accepted. Plan C students should contact the School of Graduate Studies early in their final semester to be certain that all degree requirements, including completion of graduation forms, will be met.

Master of Arts. Requirements for the Master of Arts (MA) degree (except in the Art Department) include two years (approximately 15 semester credits) of an acceptable second language, with grades of *C* or above (unless a higher minimum grade is required by the department), or the equivalent level of learning as determined by testing approved by the supervisory committee and the graduate dean. One year each of two languages, or the equivalent as determined by approved testing, is acceptable if approved by the student's supervisory committee. Coursework to meet this requirement cannot have been used for another degree and cannot be more than eight years old.

Approved testing procedures include the following:

1. Take and pass (*C* or above, unless the department requires a higher minimum grade) a language course at the appropriate level (i.e., the final course in a two-year sequence).

2. Take a test given by USU's Languages and Philosophy Department or at the BYU Testing Center and be certified for language equivalency for 15 or more semester credits. To obtain information on languages for which tests are available at USU and BYU, as well as to make arrangements for testing, contact the USU Department of Languages and Philosophy.

3. Arrange testing at another university center or testing agency approved by the department and the graduate dean.

4. For an international student: (a) certification of English competency through either a TOEFL score of 550 or above, a passing score on the IELI English Proficiency Test, or completion of IELI courses; and (b) certification of a second language through 1, 2, or 3 above.

Credit Requirements. At least 24 semester credits for a master's degree must be from Utah State University. The minimum requirement for a master's degree is 30 semester credits, except for a Plan C degree for which the minimum is 33 semester credits. For the MEd degree, the minimum number of semester credits is 36. The Master of Fine Arts is regarded as a terminal degree and requires a minimum of 60 semester credits.

Post-Master's Professional Degrees

Three degrees—the Civil Engineer (CE), Educational Specialist (EdS), and Electrical Engineer (EE)—are designed for students who seek to improve their professional skills and knowledge beyond the master's degree. The minimum requirement for each of these degrees is 30 semester credits beyond the master's degree (60 credits beyond a bachelor's degree). Each degree requires a project report that is prepared to the same format specifications as a thesis, but is not reviewed by the School of Graduate Studies thesis coordinator or signed by the graduate dean.

Doctoral Degrees

When a doctoral student is admitted, the department head appoints a temporary adviser to work with the student until a supervisory committee is established. A **Supervisory Committee** form must be submitted to the dean of the School of Graduate Studies for approval by the end of the student's second semester following matriculation. Committee changes are not to be made during the six weeks prior to the final defense.

A doctoral supervisory committee must include at least five faculty members with doctoral degrees who are approved by the department head and the dean of the School of Graduate Studies. Three members must be from within and at least one must be from outside the department or interdepartmental degree-granting program in which the student is matriculated. Adjunct faculty can serve on doctoral committees with the approval of the dean of the School of Graduate Studies.

The supervisory committee specifies the student's Program of Study; approves the dissertation proposal; supervises the student's research, qualifying examination, preparation of the dissertation, and comprehensive examination; and conducts the final oral examination. The major professor is the chairperson of the committee and usually directs the student's research. Continuation in a doctoral program is contingent upon the availability of a major professor.

By the end of the third semester, the student should have submitted a **Program of Study** to the School of Graduate Studies.

The supervisory committee must verify the writing competency of each doctoral student. The method of competency verification is determined by the committee and/or department. Certification of the student's writing competency is included on the Program of Study form.

The student and all committee members are required to sign a **Data and Copyright** form and a **Plans for Publication** form. The forms are given to the student with his or her copy of the approved supervisory committee form and must be submitted by the student to the Graduate School Office with the **Program of Study**.

Some departments or interdepartmental programs administer qualifying examinations. Each department or program has the responsibility of administering comprehensive examinations.

Following completion of all or most courses, successful completion of comprehensive examinations, and approval of a proposal for dissertation research, and **at least three months** before the final defense, the student must submit an **Application for Candidacy** form to the Graduate School Office, along with a copy of the dissertation proposal, signed by all members of the supervisory committee. Submission of the candidacy form is a major step in the student's program, because the committee and department head thereby attest that the student is ready to conduct independent dissertation research, although successful completion of that requirement is not guaranteed.

Credit Requirement. The minimum requirement for a doctoral degree is 60 approved semester credits in addition to a master's degree, or 90 approved graduate semester credits with no master's degree. Coursework cannot be used for more than one degree.

A minimum of 12 dissertation credits is required for a post-master's doctorate and a minimum of 18 for a no-master's doctorate. The semesters during which a student registers for dissertation credit should correspond as closely as possible to the semesters in which the dissertation work is done and faculty supervision is provided.

For the PhD, a minimum of 33 USU credits is required. At least three semesters, two of which must be consecutive, of full-time registration in residency at USU are required. For the EdD, a minimum of 39 USU semester credits is required. At least three semesters must be full-time registration in residence at USU; none of the semesters need to be consecutive, but two full-time semesters must be taken on campus prior to dissertation credit. Some departments also have language requirements.

With the approval of the supervisory committee and the graduate dean, graduate credit may be transferred from an accredited graduate school, provided the minimum residency requirements are met and the credit has not been used for any other degree. Transfer credit more than eight years old may not be acceptable (see **Time Limit** section, page 61). Transfer credits will be shown on official USU transcripts upon completion of the degree.

Preparation and Approval of Theses, Plan B Papers, and Dissertations

Before beginning work on a thesis, Plan B paper, or dissertation, a student should obtain the *Publication Guide for Graduate Students*, available at cost from the USU Bookstore, and the style manual or journal approved by the supervisory committee and/or department. These documents will guide the student in the proper preparation of his or her manuscript. Theses and dissertations may be prepared in either traditional or multiple-paper format. One article or article-manuscript may **not** be submitted as a thesis or dissertation.

Preparation of a thesis, Plan B paper, or dissertation is the culminating learning experience for a graduate student. The quality of the product, which should represent the student's own best work, is the responsibility of the student. Monitoring the quality of the thesis, Plan B paper, or dissertation and mentoring the student in writing are responsibilities of the major professor, with the assistance of the supervisory committee. Editing by anyone other than the major professor and the supervisory committee should be limited to mechanics, such as spelling and grammar.

Drafts of sections should be submitted periodically to the major professor for critique. Committee members should be consulted, especially on sections that involve their special expertise. The School of Graduate Studies thesis coordinator (in Main 164) will review an early draft for format and style.

Oral Examination and Defense. The final oral examination should be scheduled by the student after all courses and the thesis, Plan B paper, or dissertation are completed, but **at least eight weeks** before the student's anticipated program completion date. Changes in the membership of a supervisory committee cannot be made during the six weeks prior to the final exam without a written request from the department head and approval of the graduate dean.

At least four weeks prior to the exam, the student shall give a copy of the thesis, Plan B paper, or dissertation to each member of the supervisory committee for approval or corrections. An **Appointment for Examination** form must be completed by the student and committee, indicating approval of the proposed time and place for the examination and defense, and submitted by the student to the Graduate School Office **a minimum of five working days** prior to the exam.

No committee member should agree to proceed with a defense until he or she has carefully read and approved the thesis, Plan B paper, or dissertation. If any member of a committee believes that the document is not ready to be defended, he or she should notify the student and major professor and not sign the Appointment for Examination form. The defense should then be rescheduled.

The oral examination on the thesis, Plan B paper, or dissertation is a defense of a final document. Only minor changes, usually editorial, should be required following the defense. If major changes are required, a defense of the revised document should be held.

The chairperson of the examination is appointed by the graduate dean. At the examination, the student defends his or her thesis, Plan B paper, or dissertation and answers questions about the area of specialization. The results of the exam and any additional requirements are recorded on the **Record of Examination Completion** form, which is submitted to the Graduate School Office.

All members of the supervisory committee must approve and

sign the thesis, Plan B paper, or dissertation. In the event of lack of unanimity, the matter is taken to the dean of the School of Graduate Studies.

Any final examination held without following the proper procedures is invalid. Graduate students failing to complete all degree requirements within one year of a successful defense will be required to redefend. Students must register for at least 3 credits the semester of redefense.

The student must submit the final committee-approved and signed thesis/dissertation to the thesis coordinator in the Graduate School Office **at least seven weeks** before the last day of the summer or fall semester and **at least seven weeks** prior to the spring semester commencement deadlines. At other times, the signed thesis/dissertation must be submitted at least four weeks prior to anticipated program completion. The student is responsible for proofreading the thesis/dissertation and having it read and approved by the departmental reviewer before submitting a final draft to the thesis coordinator. The thesis coordinator will review the paper for proper format and conformity to departmental and School of Graduate Studies standards and will also check to ensure that it is well-written and neatly typed and that grammar, punctuation, spelling, and other writing mechanics are correct. The coordinator will attach a checksheet of format, stylistic, and mechanical problems and will mark examples of needed changes on the paper.

Format corrections and required rewriting must be completed before the thesis coordinator will submit the thesis or dissertation to the graduate dean for approval.

The graduate dean examines each thesis and dissertation before approving and signing it. Any may be selected for further review by members of the faculty not on the student's supervisory committee or by expert reviewers at other institutions before being accepted by the dean.

Final Steps

At the defense or final examination, the student will be given the following forms:

1) **Graduation Fee Payment Form**—$15

2) **Commencement Data Card**

3) **Binding Fee Card**—$20 for the required two copies and $10 for each additional copy. (The student is responsible for all copying costs.)

4) **Microfilming Agreement Form**—$40 for master's thesis and $50 for doctoral dissertation.

5) **Survey of Earned Doctorates**, if a doctoral student

6) **Questionnaire for Hometown News Release**—optional

7) **Alumni Card**

Fees must be paid at the Cashiers Office, and the forms completed and submitted to the Graduate School Office, before degree requirements are considered completed.

In addition, two copies of the thesis or dissertation and one additional copy of the title page and an abstract for *University Microfilms International* (150-word maximum for theses and 350-word maximum for dissertations) must be turned in to the School of Graduate Studies for binding and microfilming.

The final committee-approved Plan B paper must be taken to Special Collections in the Merrill Library to be microfiched. Special Collections personnel will provide a paper-receipt that must be submitted to the Graduate School Office before the degree is considered completed.

Also, incomplete grades must be removed from the student's record by the major professor using forms provided by the Enrollment Services Office. For nonthesis master's programs, the Graduate School Office must receive a letter of completion from the department head or interdepartmental program director. It is the student's responsibility to make sure that these final steps are taken.

Delay of Publication Policy

A thesis or dissertation must not contain material that cannot be disclosed publicly. However, occasionally it is in the University's best interest to delay disclosure of the contents of a thesis or dissertation while patenting and/or commercial development possibilities are investigated or for a period of report review by a funding agency. In such cases, publication of a thesis or dissertation through submission to the Merrill Library and to University Microfilms International (UMI) may be delayed without delaying award of the student's degree. A copy of the publication delay policy, including the procedures for requesting a delay in library submission, can be obtained in the School of Graduate Studies Office.

Diplomas and Commencement

Diplomas are ordered by the registrar's office at the end of each semester, except spring semester, for students who complete within the semester. For spring semester, diplomas will be ordered after the Commencement deadline for those students completing before that deadline, and they will be available immediately after the Commencement ceremony, unless they are being held for spring semester grades, unpaid fees, or unmet requirements. If a student needs verification of completion of a degree before the diploma arrives, the registrar will provide an official **Certificate of Completion**. The actual date of completion is usually the date the student completes the coursework on his or her Program of Study and/or the graduate dean approves a thesis/dissertation or the date a departmental letter of completion is received by the School of Graduate Studies. The completion date for students who complete their degree requirements during spring semester, but after the Commencement deadline date, will be the Monday after Commencement, and their diplomas will be ordered at the end of summer semester.

Only students completing degrees by the published Commencement deadline date for a given year will be included in the official Commencement program for that year, although other students who complete requirements by a later date during spring semester, established by the graduate dean, may participate in the Commencement ceremonies.

Graduate Interdepartmental Curricula

Interdepartmental
Concurrent Degrees

Students may pursue concurrent master's degrees or concurrent master's and doctoral degrees with the approval of the cooperating departments and the graduate dean.

Guidelines for Concurrent Master's Degree Programs. In special cases, a student may complete concurrently the requirements for two master's degrees in different departments but with fewer than the total credits required by both programs, provided that the following conditions are met:

1. The student must formally apply and be accepted into both programs at the same time, and then pursue the degrees concurrently;

2. The chairperson of the student's supervisory committee in each department must also be a member of the other committee;

3. The supervisory committee, the two department heads, and the graduate dean must approve the course of study for each degree;

4. There can be a maximum of 9 credits of overlap in courses between the two degree programs, and **the overlap must be in the elective or broadening courses**. With the allowance of overlapping, a student could thus complete the requirements for both degrees with up to 9 fewer semester credits than the usual minimum total for two degrees.

Guidelines for Concurrent Doctoral-Master's Degree Programs. In special cases, a student may complete concurrently the requirements for a doctorate and a master's degree in different departments with fewer than the total credits required by both programs, provided that the following conditions are met:

1. The student must formally apply and be accepted into both programs at the same time, and then pursue the degrees concurrently.

2. The student's doctoral supervisory committee must consist of four members from the doctoral department and two members from the master's department if the student is on a thesis plan. The master's committee must consist of two master's departmental members and the chair of the doctoral committee.

3. The student's supervisory committee, the two department heads, and the graduate dean must approve each course of study.

4. There may be a maximum of 15 semester credits of overlap in courses between the two degree programs, and **the overlap must be in the elective or broadening courses**. With the allowance of overlapping, a student could thus complete the requirements of both degrees with a minimum of 75 semester credits rather than the usual 90 minimum.

Interdepartmental Degrees, Specialization, and Certificate

Several interdepartmental graduate degrees are offered at Utah State University. These include: the Interdepartmental Doctoral Program in Education (EdD, PhD), the Interdepartmental Program in Ecology (MS, PhD), the Master of Business Administration (MBA), the Interdepartmental Program in Social Sciences (MSS degree), the Interdepartmental Program in Toxicology (MS, PhD), the Interdepartmental Program in Watershed Science (MS, PhD), the PhD in Family Life, and the Master of Natural Resources (MNR). Also offered are the Interdepartmental Specialization in Molecular Biology (MS, PhD) and the Interdepartmental Certificate in Natural Resource and Environmental Policy. In addition, there is an Interdepartmental Program in Environmental Engineering.

Descriptions of the interdepartmental graduate programs are included alphabetically within the *Instructional Units and Programs* section of this catalog.

Colleges

College of
Agriculture

Dean: *Rodney J. Brown*
Office in Agricultural Science 223, (435) 797-2215

Associate Dean for Academic Programs and Extension: *Ralph E. Whitesides*
Associate Dean for International Programs: *James H. Thomas*
Associate Dean for Research and Director, Agricultural Experiment Station: *H. Paul Rasmussen*

FAX (435) 797-3321
WWW http://www.usu.edu/~psbdept/index.html

The College of Agriculture includes the following departments:

Agricultural Systems Technology and Education
Animal, Dairy and Veterinary Sciences
Economics[1]
Nutrition and Food Sciences[2]
Plants, Soils, and Biometeorology

Degrees and curriculum options are listed in the *Instructional Units and Programs* section of this catalog. In addition to programs in the departments, the MS and PhD degrees in toxicology involve more than one department.

Agriculture today is a dynamic, rapidly changing industry. It includes more than farming or producing food and fiber. It embodies all the occupations connected with the production, processing, marketing, and distribution of farm products.

Agriculture is the nation's largest industry. Of the 131 million people employed in the United States, about 21 million (16 percent) work in agriculture. This includes about half a million scientists who serve agriculture directly or indirectly. The agricultural industry is the biggest buyer, seller, and borrower in the United States, and it has the largest investment of any industry.

Today's agriculture offers graduates challenging opportunities in a highly technological and competitive society. Students must be prepared to interact in such a society when they complete their formal education.

The success of various curricula in agriculture is manifest by the achievements of the graduates. They are setting new standards for agricultural production and in positions as professional specialists, teachers, research investigators, and leaders in agriculture and related industries locally, nationally, and internationally.

Education in agriculture includes fundamental science as well as applied business and technology. Many graduates continue their education for advanced degrees and other specialized education and training.

Admission Requirements

Undergraduate students accepted in good standing by the University are eligible for admission to the College of Agriculture.

[1]Jointly administered with the College of Business.

[2]Jointly administered with the College of Family Life.

Facilities and Equipment

The Agricultural Science Building houses the administrative offices of the College of Agriculture, the Agricultural Experiment Station, and University Extension, as well as the Plants, Soils, and Biometeorology Department. The Animal, Dairy and Veterinary Sciences Department personnel are housed in the Agricultural Science Building, the Animal Sciences Building, and the Veterinary Science Building. The Agricultural Systems Technology and Education Department is located in the Agricultural Systems Technology and Education Building. Economics is housed in the Business Building. The Department of Nutrition and Food Sciences is housed in the Nutrition and Food Sciences Building. Some classes and laboratories are located on Agricultural Experiment Station facilities near the campus, where research and teaching interact. Research units located in more distant areas of the state provide research opportunities for graduate students and faculty members.

Curricula in Agriculture

Students may work toward the Bachelor of Science degree in any of the departments of the College of Agriculture. Preveterinary training is offered in the Department of Animal, Dairy and Veterinary Sciences.

There are three basic curricula offered by most departments: (1) science, (2) general or production, and (3) business. Departmental listings detail the requirements for earning a degree in these curricula.

Science. Students who choose the science curriculum are taught the fundamentals of physical and biological sciences that are significant to agriculture. In the basic science courses, students prepare themselves for graduate work and eventually research and teaching careers in the natural sciences. Graduates in science curricula are also prepared to do research or technical work in agriculturally oriented businesses such as farm chemicals, livestock health, feed processing and marketing, crop breeding, water use, and food processing.

Science curricula are offered in the Departments of Animal, Dairy and Veterinary Sciences, Nutrition and Food Sciences, and Plants, Soils, and Biometeorology.

General or Production. This curriculum is designed to educate students to meet the special demands of today's

agriculture. Successful modern agricultural production requires an understanding of the latest scientific knowledge and an ability to apply the information. The production curriculum will satisfy the needs of a student who plans to be involved in production agriculture, to be a farm manager, or to work directly with farm operators as a businessman or as a government or farm organization employee.

This curriculum is offered in the Departments of Agricultural Systems Technology and Education, Plants, Soils, and Biometeorology, and in animal and dairy majors of the ADVS Department.

Business. The businesses and industries that buy from, sell to, and provide service for people involved in production agriculture are expanding the need for men and women educated in agriculture. These enterprises include feed, fertilizer, machinery, and chemical firms that supply the producer's needs, as well as marketing firms that assemble, process, ship, and merchandise agricultural products. Managers of large-scale farm enterprises also profit from the kind of education provided by the business curriculum. Students who want to capitalize on their agricultural background while pursuing a business or industrial career should consider the business option.

This curriculum is offered in the Departments of Economics, Agricultural Systems Technology and Education, Nutrition and Food Sciences, Plants, Soils, and Biometeorology, and in the animal and dairy majors of the ADVS Department.

Interdepartmental and intercollege cooperation has and will continue to facilitate the development of various other curricula. Students should not hesitate to inquire about the possibilities of following a curriculum that would allow for special needs. Advisers in each department are available and should be consulted for guidance in scheduling classes and in planning careers.

Financial Support

The College of Agriculture and the agricultural industry in the Intermountain West annually sponsor over 100 scholarships, internships, and assistantships. The college and the local agribusinesses also support many students through work experience programs. For further information, contact the College of Agriculture Dean's Office (Agricultural Science 223) and/or individual department offices.

Safety and Liability in Classes and Laboratories

Certain classes and laboratories involve a risk of bodily injury or of damage to clothing. Students should take appropriate precautions and wear suitable protective clothing. Some of the risks include handling or being near animals, slick floors or corrals, use of toxic or corrosive substances, and the use of sharp or breakable instruments and equipment. Students should take safety precautions during demonstrations or work with animal tissues or operative procedures. Students must assume their own liability protection for travel to and from classes, laboratories, and field trips. The University and its employees assume no liability in the performance of classroom or laboratory instruction or on scheduled field trips, or for other dangerous activities. The student, by voluntarily participating in these classes and activities, agrees to assume the risk and not hold USU or its staff liable.

College of
Business

Dean: *David B. Stephens*
Office in Business 212, (435) 797-2272

Senior Associate Dean: *David H. Luthy*
Associate Dean for Business Relations: *Ross E. Robson*
Associate Dean for Graduate Programs: *C.R. Michael Parent*
Director of the Small Business Development Center: *Franklin C. Prante*
Director of the Student Service Center: *Karen W. Peterson*
Director of the Utah Center for Productivity and Quality: *Gary B. Hansen*

FAX (435) 797-0272
E-mail karen@b202.usu.edu
WWW http://www.bus.usu.edu/

Academic Departments. The College of Business includes the following academic departments. Information about degrees and curriculum options are listed in the departmental sections of this catalog.

Accountancy, School of
Business Administration
Business Information Systems and Education
Economics[1]
Management and Human Resources

Interdisciplinary/College Programs. The College of Business offers the following programs in addition to those offered by academic departments. Detailed descriptions of these programs are provided in this section of this catalog and in the separate *Master of Business Administration (MBA)* section.

Business Minor
Dual Major and Second Bachelor's Degree in Business
International Business Minor
Master of Business Administration (MBA)

Nondegree and Other Programs. A wide variety of seminars

[1]Jointly administered with the College of Agriculture.

and development programs are sponsored by academic departments and other units of the college. For example, *Business Relations* offers annual seminars in accounting, banking, customer service and marketing, human resources, international business, management information systems, and quality and productivity. The *Management Institute* meets the unique continuing education needs of a specialized segment of the population: supervisors, managers, and executives who provide leadership and direction for both private and public sector organizations. The *Small Business Development Center* provides a variety of specialized diagnostic, consultative, manpower development, and industrial development services to individual businesses.

Accreditation. All bachelor's and master's degree programs in business are accredited by AACSB—The International Association for Management Education. This association is the professional accrediting agency in business. Accreditation by the AACSB facilitates transferability of credits to other institutions and acceptance of the credentials of graduates by the business community.

Objectives

The college is engaged in the following three primary areas of activity: **education**, **outreach**, and **research**.

The college's **educational objectives** emphasize preparation for professional careers in business. The managerial and technical skills associated with such preparation may also lead to careers in other types of organizations, such as health service, government, and education. This preparation is directed at both entry-level and mid-career qualifications. Thus, students can be immediately productive on a new job assignment and at the same time have the depth and breadth of education to assume increasing responsibilities. Additionally, experienced managers and business people can learn needed new capabilities and renew their educational backgrounds with college programs. An extensive offering of vocationally oriented programs in clerical and technical fields is also provided. Besides its career orientation, the College of Business educational objectives include a commitment to enhancing the lifelong learning opportunities for responsible citizenship and personal satisfaction where economic and business dimensions are critical ingredients.

In implementing its **outreach objectives**, the college extends its resources and services to off-campus patrons by offering distance education programs and classes, participating in Continuing Education Centers, and by conducting on-site visits to individual firms and organizations, thereby enhancing the quality of life and economic well-being of citizens of the state.

The college is committed to an aggressive program of basic and applied **research** to insure the continued enlargement of the base of understanding about business, government, and other complex institutions; about the processes of managing; and about the economic foundations upon which they function.

Undergraduate Programs

Admission and Graduation Requirements

New freshmen admitted to USU in good standing qualify for admission to the College of Business. Students with 1-46 semester hours of credit, who transfer to the College of Business from other institutions or from other colleges at USU, are required to have a minimum overall GPA of 2.20. Students who transfer with 47 or more semester hours of credit are required to have a minimum overall GPA of 2.50. Upon admission, all degree-seeking students will be identified with the College of Business Prespecialization Unit for the purpose of qualifying for Advanced Standing within their major field. The College of Business Student Service Center, located in Business 306, provides initial counseling and guidance until such time as a student qualifies for unconditional Advanced Standing. Students may declare a major upon admission, but will receive advisement through the Student Service Center, Business 306, while preparing for Advanced Standing. Nondegree-seeking students and Associate of Applied Science students will bypass the Prespecialization Unit and work directly with the selected program administrators within departments of the college.

Enrollment Restrictions. Admission to the college does not insure access to the courses required for graduation. The following admission requirements must be met by all USU students:

1. An overall GPA (transfer credits included) of 2.20 and 20 semester credits of college-level work are required for admission into Acct 2010, 2020; MHR 2990; and BIS 2550.

2. An overall GPA of 2.50 and completion of 40 credits are required for admission into Acct 3110, 3120, 3310, 3410; BA 3080, 3400, 3500, 3700; BIS 3000, 3100, 3330, 3500; Econ 3400; and MHR 3110, 3710, 3720, 3810, 3820.

3. All 4000- and 5000-level courses in the College of Business are restricted to students with unconditional Advanced Standing and the continued maintenance of a 2.50 overall GPA.

4. An overall GPA of 2.50, unconditional Advanced Standing, and completion of 84 credits are required for admission into MHR 4880 and 4890.

5. To earn a College of Business bachelor's degree, at least 51 semester credits must be from courses outside the College of Business.

6. Many of the courses in the College of Business require prerequisites. Before registering for courses within the College of Business, students should consult with their adviser or refer to the current *General Catalog* to ensure they have completed the necessary prerequisites.

University Studies (General Education) Requirements. All freshmen-level students who enter USU Fall of 1998 and thereafter will be required to meet the new University Studies (General Education) requirements. An Associate of Arts/Science degree from a college or university in the Utah System of Higher Education or a school with which the College of Business has an articulation agreement will complete the University's General Education requirements. Until the year 2000, transfer students and students who attended USU prior to Fall 1998 have the option of completing *either* the new University Studies requirements *or* the General Education requirements that were in effect prior to Fall of 1998. It is recommended that all business students visit with an

adviser in the Student Service Center, Business 306, to clarify their specific requirements in this area. Additional information about these requirements is available on pages 50-53 of this catalog.

Advanced Standing. All degree-seeking students in the college are required to complete the following Prespecialization Core program prior to being granted unconditional Advanced Standing: Acct 2010 and 2020 (6 credits); BIS 2450 and 2550 (6 credits); Econ 1500 and 2010 (6 credits); Math 1050 and 1100 (7 credits), Stat 2300 (4 credits); MHR 2990 (3 credits); Psy 1010 or Soc 1010 (3 credits); and one of Acct, BIS, BA, Econ, or MHR 1000 (0.5 credits). Prerequisites to these courses must be completed before enrollment will be permitted.

In addition, the following requirements must be met before unconditional Advanced Standing is granted.

1. A total of 52 semester credits of college-level courses (or equivalent), including the college Prespecialization Core program, must be completed with a cumulative GPA of 2.50 or better. This includes all transfer credits. The current semester registration may be included in the 52 credits; however, final approval of Advanced Standing is contingent upon successful completion of the current semester with the required grades.

2. All College of Business majors must complete the college Prespecialization Core program with a minimum GPA of 2.50.

3. An Application for Advanced Standing must be filed with the College of Business Student Service Center in Business 306. Deadlines for filing the application are published each semester by the Business Student Service Center, Business 306.

Upon completion of the Prespecialization Core program, students who choose not to enter a major field program, or who do not qualify for advanced standing within a major field, may receive counseling regarding alternative courses of action.

USU Courses. Thirty of the last 60 semester credits must be taken from Utah State University, 10 of which must be included within the last 40 credits presented for the degree. At least fifty percent of the business credits required for a business degree must be taken from Utah State University. Courses taken at a designated USU Continuing Education Center may be counted as courses taken from USU.

Optional *P/D+, D, F* Grade Restriction. This option (see the USU "Grading Policy," pages 18-19) is not available for any required courses for majors and minors in the College of Business.

College of Business Stop-out Policy. Students having a break in attendance of College of Business programs in excess of one year will be subject to the college and departmental requirements in effect at the time of their return. However, if a student has received unconditional Advanced Standing under a previous set of requirements, this will be honored even though Advanced Standing requirements may have changed.

Graduation. Students must satisfy all University, college, and departmental major requirements to be eligible for graduation. Refer to appropriate sections of this catalog for details. In addition, at least 60 credits must be taken in courses outside the College of Business. For this requirement, 9 credits of Economics and 6 credits of Statistics may be counted among those taken outside the College of Business.

Minor in Business

The college offers a minor for nonbusiness majors consisting of the five courses listed below. This minor is designed to develop a general background and perspective in business. Completion of this minor will acquaint students with each business discipline. Advisement for the minor in business is through the College of Business Student Service Center in Business 306. An overall minimum GPA of 2.50 is required for the five courses. Students are responsible to complete prerequisite courses where applicable. Required courses for the minor in business include Acct 2010; BA 3400 or 3460; BA 3500; MHR 3110; and one of the following courses: Econ 3400, MHR 2990, or BIS 3100.

Minor in International Busines

Both College of Business majors and nonmajors are eligible to receive the International Business Minor. This minor is designed to develop a general background and perspective in business. All students who plan to pursue this minor receive academic advisement from the College of Business Student Service Center in Business 306. This minor consists of four courses selected from a group of six courses (listed below) and completion of either a Language Competency Option or a Regional Studies Option. Four of the following seven courses are required as part of this minor: BA 4300 (International Finance), BIS 4550 (International Business Communication), BIS 5700 (Managing Global Information Systems), Econ 3400 (International Economics for Business), Econ 5150 (Comparative Economic Systems), MHR 3820 (International Management), and MHR 4890 (Business Strategy in a Global Context). Information about the Language Competency and Regional Studies Options is available in the Student Service Center, Business 306.

Minors in Other Business Subjects

Minors are available in other business subjects, as indicated in departmental sections of this catalog.

Dual Major and Second Bachelor's Degree

The College of Business offers both a dual major and a second bachelor's degree in business. This particular option requires a broad course distribution among the departments of the college. It is, therefore, administered by the college, rather than by a specific department. Requirement information is available in the College of Business Student Service Center, Business 306.

For requirement information concerning other second bachelor's or dual major degrees having specialization within the college, see departmental sections of this catalog.

Professional Organizations

The following student organizations are available for membership, depending upon student objectives and qualifications.

American Marketing Association (AMA): Organization for marketing and marketing education majors.

American Production and Inventory Control Society (APICS): Professional society for production majors.

Beta Alpha Psi: Honorary professional accounting fraternity.

Beta Gamma Sigma: Honorary business fraternity.

Association for Systems Management (ASM): Organization for students planning careers in information processing and information systems management.

Delta Pi Epsilon (DPE): National graduate honorary fraternity in business education.

Delta Epsilon Chi (DEX): Co-curricular organization for marketing education and marketing majors.

Economics Club: Organization for students majoring in economics.

Finance Club: Organization for students majoring in finance.

Institute of Management Accountants (IMA): Organization designed for accounting majors.

MBA Association: Organization for MBA graduate students.

Phi Beta Lambda (PBL): Organization designed for business or business education majors.

Sigma Iota Epsilon (SIE): National honorary and professional management fraternity.

Society for Human Resource Management (SHRM): Organization for majors in fields of personnel and human resource management.

Scholarships, Fellowships, and Assistantships

A number of scholarships and assistantships are available to College of Business students at both the undergraduate and graduate levels. See *Financial Aid and Scholarship Information* catalog section (page 27), as well as the *Graduate Financial Assistance* section (pages 59-60). There are also opportunities for employment in research projects and other activities. Assistantships for graduate students are available for both teaching and research. Applications for undergraduate scholarships may be made directly to the Student Service Center, Business 306.

College of *Education*

Dean: *Gerard R. Giordano*
Office in Emma Eccles Jones Education 109, 797-1437

Associate Dean for Education: *Deanna D. Winn*
Acting Associate Dean for Continuing Education and Field Services: *Keith T. Checketts*
Associate Dean for Research: *Ron J. Thorkildsen*
Assistant Dean for Technology: *J. Steven Soulier*

The College of Education has the following departments:

Communicative Disorders and Deaf Education
Elementary Education
Health, Physical Education and Recreation
Instructional Technology
Psychology
Secondary Education
Special Education and Rehabilitation

The College of Education provides preparation programs for prospective teachers, for counselors and other professional personnel in education, and for professionals in the human services area and in corporate settings. Students are urged to refer to the more detailed descriptions of programs, majors, and areas of specialization contained in this catalog.

Accreditation. Utah State University is a member of the American Association of Colleges for Teacher Education and is accredited by the National Council for the Accreditation of Teacher Education and the Utah State Board of Education. Students who are certified to teach in the state of Utah may qualify for certification in other states and the District of Columbia.

General Education (University Studies) Requirements. All students graduating from the College of Education must complete the 30 credits of General Education (or University Studies) required by the University, as well as two courses identified as communications intensive courses.

Admission Requirements to Teacher Education. Students wishing to enter the Teacher Education Program at Utah State University must formally apply for admission and be approved by the Office of the Associate Dean of Education, as well as by the department where the teaching major is being offered. All applicants are required to submit a record of their ACT scores and pass the Teacher Education Writing Exam. Students are not permitted to enroll in the education professional core classes prior to being admitted to the Teacher Education Program.

Detailed information about admission to the Teacher Education Program should be obtained from a departmental adviser or from the Office of the Associate Dean for Education.

Application for admission to professional curricula should be made before the end of the sophomore year, or earlier if possible. Transfer students who have had one year of collegiate work may apply during their first semester at USU.

Teacher Certification. The Dean, College of Education is assigned responsibility for the development, approval, and administration of Teacher Certification requirements for students.

The College of Education currently offers preservice teacher preparation leading to certification in 31 different areas. In addition, advanced programs leading to professional certification are available for administrators, supervisors, school counselors, school psychologists, school library media specialists, speech pathologists and audiologists, and specialists in special education.

Specific requirements for each certificate may be obtained from the Office of the Associate Dean for Education or from the

department in which the major work is offered. All students who wish to certify must complete a criminal background check.

For the early childhood, elementary, or secondary certificate, a closely supervised program of student teaching is conducted in selected schools throughout the state. Students should be financially prepared to live off campus during the semester selected as their professional semester of student teaching.

The Bachelor of Science degree with a major in elementary education, secondary education, or special education is designed for students preparing to teach in any of these fields. Students majoring in other departments of the University who wish to prepare for teaching are admitted to teacher education curricula as heretofore described. An endorsement in middle education is also available.

Dual Certification. A student desiring to obtain early childhood and elementary education, elementary and secondary, special education and elementary, or special education and secondary education certificates should consult with an adviser in the education departments early in his or her program. Ordinarily, dual certification will require at least one additional semester of work.

Teacher Placement Service. The Teacher Placement Service functions as an integral part of the University Placement Center. Students may register with the service, which will help in compiling the proper credentials to be used in placement interviews. Application for placement services should be made prior to student teaching whenever possible. No fee is charged for joining the center.

Facilities. The College of Education Edith Bowen Laboratory School is a functioning elementary school on the University campus, serving as a research, demonstration, and teacher training center.

The Center for Persons with Disabilities is a multi-discipline training, research, and service center where students engage in activities of observing, tutoring, practicums, interning, and working individually with materials designed especially for disadvantaged youth and adults.

Graduate Study

Programs at the graduate level, leading to advanced professional degrees and/or certification, are available in the administrative, supervisory, human services, clinical, library media, and counseling areas. The MEd, MS, and MA degrees are offered in most departments. An Educational Specialist (sixth-year) program is available in Communicative Disorders, Instructional Technology, and Special Education. Interdepartmental Doctorate of Education (EdD) and Doctorate of Philosophy (PhD) degrees are available with specializations in Business Information Systems and Education, Curriculum and Instruction, and Research and Evaluation. The Interdepartmental EdD also has a specialization in Special Education. PhD degrees in Instructional Technology, Psychology, and Special Education are also offered.

Education Courses (Educ)

5000H. Senior Honors Seminar. For students in the College of Education to explore an honors interdisciplinary theme selected by the Honors Committee as a culmination of an honors experience. (2Sp)

5560. Practice in Improving School Programs. Seminar focused upon different phases of the instruction program and upon new and persisting problems in teaching. (3F,Sp,Su)

6010. Introduction to Program Evaluation: Evaluation Models and Practical Guidelines. Alternative approaches and practical guidelines for conducting evaluation studies. Through case studies and simulations, addresses impact of social, political, and ethical issues on evaluation. (3F,Su)

****6080. Leadership and the School Principal.** Focuses on leadership and communication skills in educational organizations. Covers role of the principal in curriculum, instruction, and administration of human resources. Emphasizes school leadership functions and knowledge of local, state, and national educational organizations. (3Su)

****6100. Theories of Instructional Supervision.** Principles and theoretical base of supervision as they relate to improving instructional practices. Emphasizes research findings and recommended practices. (2Sp,Su)

6240. Introduction to Student Development Theory. Helps students gain an overall understanding of student development theories and how these theories should influence and inform practice. Students will be able to identify theories and suggest ways to apply them to enhance students' development. (3F)

6250. History and Development of Higher Education and Student Services. Introduces students to the history and development of higher education and the student personnel field by acquainting them with the history of the profession, some of the profession's theoretical and organizational foundations, and basic issues faced by student services professionals. (3Sp)

6410. Educational Foundations. Examines current educational issues and trends within contexts of history, philosophy, and cultural foundations. (2Sp,Su)

6550. Research for Classroom Teachers. Assists teachers in applying measurement issues and research methods to classroom problems; in locating, interpreting, and using research reports; and in writing research-related papers on teaching. (3F,Sp,Su)

6560. Practicum in the Improvement of Instruction. Field-based program focused upon effective teaching methodologies, teaching performance, curriculum decision making, and characteristics of the learner. (1-4F,Sp,Su) ®

6570. Introduction to Educational and Psychological Research. Provides introduction to research methods, including identification of research problem, review and evaluation of research literature, and design and implementation of research project. Prerequisite: Psy 2800. (3F,Sp,Su)

6600. Measurement, Design, and Analysis I. Integrates concepts in measurement, research design, and statistical anaylsis for research in psychology and education. Emphasizes experimental design, correlation, regression, and general linear model. Prerequisites: Psy 2800, Educ/Psy 6570. (3F,Sp,Su)

6610. Measurement, Design, and Analysis II. Builds on content of Educ/Psy 6600, and extends measurement, research design, and statistical analysis concepts to include within-subject and factorial designs, analysis of variance and covariance, and introduction to factor analysis and structural equation modeling. Prerequisite: Educ/Psy 6600. (3F,Sp,Su)

6700 (d7700).[1] Single-Subject Research Methods and Designs. Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. (3F,Su)

6710. Diversity in Education. Provides educators with background and techniques for more effectively addressing the needs of students in culturally and linguistically diverse society. Diversity topics also include religion, socioeconomic class, ability differences, gender, and sexual orientation. (3F,Su)

****6740. School Law.** Acquaints students with legal issues relating to public education. Considers rights and responsibilities of students, teachers, and educational practitioners. Relates these rights to school programs and operations as determined by state and federal laws and court decisions. (3Su)

6770. Qualitative Methods I. Introduction to qualitative research, including foundations; research designs and strategies of inquiry (case studies, ethnography, phenomenology, grounded theory, biographical, historical, participative inquiry); sampling; fieldwork and data collection; and analysis. Prerequisite: Educ/Psy 6570. (3F)

6780 (d7780). Qualitative Methods II. Builds on and applies concepts covered in Educ 6770, emphasizing analysis of data, critique of qualitative research, and design and implementation of qualitative research. Students registered for 7780 conduct a qualitative research project. Prerequisite: Educ 6770. (3Sp)

6840. Workshop: Intermountain Conference on Education of the Gifted and Talented. Provides instruction by leading national authorities in gifted and talented education, as well as networking with gifted education from throughout the Intermountain West. (1-2Su) ®

6950. Leadership Portfolio Development. Creation of leadership portfolio as culminating activity for completion of Administrative/Supervisory Endorsement. Portfolio includes leadership vision, educational philosophy, and professional resume. (1F,Sp,Su)

****7100. Practices of Instructional Supervision.** Application of instructional supervisory theories and practices of supervisory behaviors as they relate to improvement of instruction. Prerequisite: Educ 6100. (3Sp,Su)

7150. Curriculum Theory. Examines the role interpretist/phenomenological, political, cultural, and theoretical perspectives play in the development of school curriculum. Prerequisite: ElEd/ScEd 6150. (2Sp)

7300. Historical, Social, and Cultural Foundations of Education. Examines relationship of modern school in terms of historical, cultural, and social foundations of education. (3F,Su)

7310. Teaching-Learning Foundations in Education. Seminar in which learning theories and teaching models/skills are demonstrated, critically examined, and integrated. Prerequisite: Graduate course in educational psychology or equivalent. (3Sp)

****7320. Instructional Leadership.** Emphasizes application of theory, research, and effective practice to instructional and curricular improvement. Examines educational change. (3Sp,Su)

****7500. Public School Finance.** Background and understanding of public school finance. Principles and practices utilized in collecting, distributing, and managing district and school revenues, with emphasis on Utah. Collective bargaining practices and capital facilities development also emphasized. (3Su)

7670. Proposal Development. Advanced concepts in designing, writing, and critiquing literature reviews including meta-analysis. Students work with instructor and their adviser to develop a dissertation proposal. Prerequisite: Educ/Psy 6610, Educ 6770. (3F,Sp,Su)

7700 (d6700). Single-Subject Research Methods and Designs. Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. (3F,Su)

7780 (d6780). Qualitative Methods II. Builds on and applies concepts covered in Educ 6770, emphasizing analysis of data, critique of qualitative research, and design and implementation of qualitative research. Students registered for 7780 conduct a qualitative research project. Prerequisite: Educ 6770. (3Sp)

7970. Dissertation Research. Dissertation research for students in the Research and Evaluation specialization. (1-18F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

College of
Engineering

Dean: A. Bruce Bishop
Office in Engineering Class 110, (435) 797-2775

Associate Dean: *Alma P. Moser*
Associate Dean: *Ronald L. Thurgood*
Academic Adviser: *Kathleen E. Bayn*
Academic Adviser: *Janet Hanson*
Industry and Professional Relations Director: *Robert L. Davis*
Research Proposal Development and Support: *Colleen A. Riley*
Engineering Design and Technology Center Director and Field Engineer for Utah MEP: *Stephen Reed*

FAX (435) 797-2769
E-mail office@engineering.usu.edu
WWW http://www.engineering.usu.edu

The College of Engineering includes the following research units:

Center for Space Engineering: *Frank J. Redd*, Director
International Irrigation Center: *Humberto L. Yap-Salinas*, Director
Utah Water Research Laboratory: *Ronald C. Sims*, Director
Engineering Experiment Station: *Alma P. Moser*, Director
Interdepartmental research programs under the Engineering Experiment Station are:
- Institute for Natural Systems Engineering
- Center of Self-Organizing Intelligent Systems
- National Center for Design of Molecular Function
- Center for Solid Waste Recycling
- Utah Transportation Center
- Utah Technology Transfer Center

The College of Engineering has the major involvement in:

Utah State University Research Foundation and **Space Dynamics Laboratory**: Allan J. Steed, President and CEO

Space Dynamics Laboratory: Frank J. Redd, Executive Vice President
Space Dynamics Laboratory, Systems Division: David A. Burt, Director

The College of Engineering includes the following academic departments:

Biological and Irrigation Engineering
Civil and Environmental Engineering
Electrical and Computer Engineering
Industrial Technology and Education
Mechanical and Aerospace Engineering

The BS, ME, MS, MES, and PhD degrees are offered with specific majors, along with the Civil Engineer (CE) and Electrical Engineer (EE) degrees. The various departments are nationally recognized for their instructional and research programs. Engineering seniors continually rank very high nationally on the Fundamentals of Engineering exam, which is required for professional engineering registration. Graduates from the college hold prominent positions within industry, education, and government.

The undergraduate engineering programs offered by USU, which are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET), are: Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, Manufacturing Engineering, and Mechanical Engineering.

For details of the various majors and specialties offered by the above departments, see the respective departmental sections in this catalog.

The Industrial Technology and Education Department offers the BS in Industrial Technology or Industrial Teacher Education, and the Master of Science in Industrial Education. Associate of Applied Science (AAS) degrees are available in aeronautics and drafting.

Industrial Teacher Education prepares and qualifies graduates to teach industrial and technical education in the secondary schools. In addition, a highly specialized program prepares teachers for post-high school technical college teaching.

The Industrial Technology program provides both general education and specialized training to qualify graduates for high-level technical and supervisory positions in industry.

See Industrial Technology and Education listing in this catalog (pages 249-256) for details about admissions, academic requirements, and University Studies (General Education) for Technology majors.

Undergraduate Programs

Objectives

The purposes of the engineering curriculum are: (1) to provide students with professional competence enabling them to enter and progress rapidly in their professional careers, (2) to provide an understanding of the physical and social world in which they live, and (3) to provide a basis for continued intellectual growth, professionally and socially.

In the engineering programs, the curricula begin with studies in mathematics, basic science, introductory engineering, and introductory engineering design. These basic science and engineering skills are coupled with communication skills, as well as courses in humanities and social sciences. The professional engineering programs continue with engineering science, engineering design, and computer utilization. Engineering design activities started during the freshman and sophomore years progress in-depth during the junior and senior years as the student's proficiency increases. The design experience culminates with a capstone design sequence, which builds upon the fundamentals of engineering, communication skills, science, mathematics, humanities and social sciences, economics, ethics, safety, reliability, aesthetics, and social impact.

The overriding goals of the professional engineering programs are: (1) to unite engineering sciences and computer skills with engineering design to enhance the practical problem-solving abilities, decision-making proficiency, and creativity of the engineering student; (2) to provide for an understanding and appreciation of professional responsibility and ethics; (3) to expand a sensitivity to the economic, legal, and social dimensions of engineering decisions; and (4) to provide the foundation and help instill a desire for life-long learning.

Studies in the humanities and social sciences serve not only to meet the objectives of a broad education, but also to meet the objectives of the engineering profession. In the interest of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision-making process, the College of Engineering requires coursework in the humanities and social sciences as an integral part of the engineering program. To satisfy this requirement, courses selected must provide both breadth and depth and be planned to fulfill an objective appropriate to the engineering profession.

Admission Requirements

Engineering Requirements. In addition to the policies of the University concerning admission of students, the following regulations apply to the engineering programs:

1. In order to complete an engineering curriculum in four years, high school students must complete at least two years of algebra, one year of geometry, one-half year of trigonometry, four years of English, and courses in computers, chemistry, and physics. If these courses are not taken in high school, they must be taken in college prior to starting the regular engineering programs. Students with deficiencies in several areas will probably require five years to fulfill graduation requirements.

Students can earn university credits in English, humanities,

and social sciences by receiving appropriate scores on the College Level Examination Program (CLEP) tests. Advanced placement (AP) credit may be obtained in calculus, chemistry, English, history, and physics.

2. Transfer students from other colleges or universities will be referred to the Engineering Admission Committee for evaluation. Criteria considered in admission decisions for transfer students include resources available in the requested department and the transfer GPA, along with an evaluation of the program of the former college or university. Decisions concerning academic standing once the student is admitted to USU will be based solely on USU grades.

3. Students registered on campus (including General Registration) must be approved by the Engineering Admission Committee before transferring to the College of Engineering. Students in this category must have demonstrated, by courses taken at USU, a potential to succeed in the major of their choice.

Professional Engineering Program

Introduction. The purpose of the Professional Engineering Program (PEP) is to provide a quality education for engineering students by (1) requiring that students be fully prepared for upper-division engineering coursework by having satisfactorily completed all required preprofessional courses and (2) limiting enrollment in upper-division courses consistent with resources available within the departments and the college.

Policy. Enrollment in upper-division engineering courses (3000-level and above) is available *only* to students who have been accepted into the PEP or an appropriate graduate program or have a nonengineering major which requires a specific engineering class for which the student has passed the prerequisite courses.

Application Requirements. Current PEP applications listing the required PEP courses and admission standards are available from the various departments and the office of the Dean of Engineering. The minimum requirements a student must satisfy in order to be eligible to apply for admission to a professional program are:

1. The student must be in good academic standing in the University and the college.

2. The student must achieve a grade of *C-* or better in every required preprofessional course. The *P/D+, D, F* grading option may not be used except in freshman English Composition.

3. The student must achieve an overall grade point average of 2.3 or better for all required preprofessional coursework completed at USU.

Repeated Coursework. A student can repeat no more than three of the required preprofessional courses in order to satisfy the PEP application and eligibility requirements. Multiple repeats of the same course are included in the total of three repeats. Audits count as a time taking a class unless prior written approval is obtained from the college academic adviser.

Transfer Credit. Transfer credit accepted by the department and the college may be applied toward meeting the requirements for admission into the PEP; however, the grades received will not be used in the USU GPA calculation. For students with transfer credits, a final decision on admission into the PEP will not be made until after the applicant has completed at least 12 semester credits of acceptable engineering, math, and science coursework at USU. Some of this coursework may include upper-division classes taken by permission.

Applications. Students should apply to the Professional Program midway through the semester in which they will complete all preprofessional courses. Students may request permission to take a limited number (not to exceed 15 credits) of upper-division courses if they are within 10 credit hours of completing the necessary requirements, have submitted a PEP application, and are registered for all remaining preprofessional courses. The final decision on granting permission to take upper-division classes before admission to the PEP rests with the college academic adviser and the Academic Dean of Engineering.

Admission Procedures. Satisfying minimum eligibility requirements does not ensure that a student will be admitted to a PEP program in a specific department. The number of students accepted in the Professional Engineering Program of a department will be based upon the number of students that can be accommodated in upper-division classes. Applicants will be ranked and selected in order of their academic standing in the required preprofessional courses. Admission into a PEP program is for a period of three years. Students unable to complete graduation requirements during this time will be interviewed by the department head to determine whether special circumstances justify their continuance in the program.

Academic Requirements

The Dean's Office of the College of Engineering maintains a handout sheet giving current details of all academic regulations of the college. **It is the responsibility of the student to know the current regulations and to follow these regulations.**

Preprofessional Program. Students must maintain a USU GPA of 2.0 to remain in good standing both in the college and the University. Students in a preprofessional program who are not making satisfactory progress toward acceptance into a professional program or who become ineligible to enter a professional program will be suspended from the college. Students in good standing in a preprofessional program must still meet the entrance requirements for admission into a professional program.

Professional Program. For all engineering majors in the professional program the following academic regulations apply, in addition to University regulations:

1. A GPA of 2.0 or higher must be maintained in all engineering/math/science courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and University Studies (General Education) courses are not included in this GPA calculation.

2. No more than 10 hours of *D* or *D+* credit may be applied toward meeting graduation requirements in engineering/math/science classes.

3. College of Engineering courses may be repeated only once. Audits count as a time taking a class unless prior written approval is obtained from the department head. A maximum of three required or elective courses completed as part of a professional program can be repeated in order to meet graduation requirements. (Courses completed as part of a preprofessional program are not included in this total of three repeats.)

4. The *P/D+, D, F* grading option may not be used in required or elective courses completed as part of a professional program.

(The *P/D+, D, F* grading option is approved for University Studies Courses.)

5. The academic regulations listed above (1-4) apply to required coursework and any elective engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree. That is, once a student completes a particular technical elective, it becomes a required course for that student.

6. Students in violation of departmental or college academic regulations, no longer eligible for graduation, or not making satisfactory progress toward a degree, will be placed on probation.

a. Students will be placed on probation if they (i) earn an *F* in an engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree (see No. 5 above); (ii) have more than 10 hours of *D* credit (see No. 2 above); or (iii) have a GPA of less than 2.0 (see No. 1 above).

b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 10 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a semester GPA of 2.0 or higher in engineering/math/science classes and must not earn any *D*'s or *F*'s.

While on probation, a student may not preregister. The student's major code will be changed to a preprofessional code. The student must meet at least once each semester with the college academic adviser to work out a schedule having the primary goal of correcting the existing academic problems.

General Engineering

Engineering students are encouraged to select a major as soon as possible. Many of the courses taken during the freshman year are common to all engineering majors; however, there are significant differences in the courses taken during the sophomore year. Students who have not selected a specific major should meet with the college academic adviser for assistance in planning a personalized program. Students who choose to remain in general engineering must be prepared to meet the specific requirements of a professional program in the department of their choice.

Additional Engineering Information

Professional Societies. Faculty members of the departments hold memberships in various professional societies and organizations.

Student chapters or societies include Society for Engineering in Agricultural, Food, and Biological Systems, American Institute of Aeronautics and Astronautics, American Society of Civil Engineers, Chi Epsilon, Institute of Electrical and Electronic Engineers, American Society of Mechanical Engineers, American Water Resources Association, Tau Beta Pi, International Technology Education Association, National Intercollegiate Flying Association, Professional Flight Society, American Welding Society, Society of Environmental Engineering Students, and Society of Women Engineers. Students are encouraged to affiliate with appropriate student societies.

The Engineering Council is comprised of a student from each department, a representative from each student society, and a staff member from the Dean's office. The college senator is chairperson. The council meets regularly to provide effective student-staff-administration liaison.

ROTC. Many engineering students find satisfaction in serving their country in the Reserve Officers Training Program (ROTC) and as reserve officers after graduation. Junior and senior ROTC students receive compensation equivalent to a substantial scholarship. See the Department of Aerospace Studies section of this catalog (pages 93-94).

Scholarships, Fellowships, and Assistantships. A number of scholarships and assistantships are available to College of Engineering students. Interested high school seniors are encouraged to write to the High School/College Relations Office of the University before February 28 of the year they wish to receive assistance. Continuing students, transfer students, and returning students should contact the Dean's Office, College of Engineering for a scholarship application. Completed applications are always due February 1. See the *Financial Aid and Scholarship Information* section of this catalog (pages 21-38). There are also opportunities for employment on research projects and other activities.

Graduate Programs

For information about graduate programs, admissions, assistantships, and fellowships, see departmental sections of this catalog.

Research. The College of Engineering maintains an extensive program of research through the Engineering Experiment Station and the various departments and laboratories. There are opportunities for graduate students to participate, and many undergraduates can find employment in research programs.

USU Research Foundation. The research laboratories comprising the USU Research Foundation are located near the USU campus at Logan and at Bedford, Massachusetts. The faculty members of these laboratories hold academic appointments as appropriate in the Electrical and Computer Engineering, Mechanical and Aerospace Engineering, and Physics departments, and working assistantships are available for good undergraduate and graduate students in these and closely related departments. The faculty and staff specialize in upper-atmospheric and space measurements using electro-optical and electrodynamical instrumentation flown on rockets, satellites, aircraft, and balloons. A recent project flew a cryogenically cooled interferometer spectrometer aboard the space shuttle.

International Irrigation Center. The International Irrigation Center conducts an extensive program of irrigation training and technology transfer through multi-lingual courses and through research. The center contributes significantly to improve irrigation practice, water management, and food production through these activities.

Utah Water Research Laboratory. The Utah Water Research Laboratory offers facilities and student support for water research, including surface and ground water resources management and use. Strong programs have been developed through multiple projects in weather modification, water quality control, waste water treatment, hydraulics, flood and erosion control, hydrology,

groundwater modeling, salinity control, water use in energy development, water systems optimization, and the socioeconomic aspects of water resources planning. Studies are coordinated with academic programs in the departments of Civil and Environmental Engineering, Biological and Irrigation Engineering, and related departments in other colleges.

Engineering Experiment Station. The Engineering Experiment Station furthers engineering science, education, and practice through a variety of research programs to serve the needs of Utah and the nation. The experiment station especially encourages the development of interdisciplinary interdepartmental research. Major activities are currently underway in the Institute for Natural Systems Engineering, the Center of Self-Organizing Intelligent Systems, the National Center for Design of Molecular Function, the Center for Solid Waste Recycling, the Utah Transportation Center, and the Utah Technology Transfer Center.

Graduate Study. The college offers graduate study programs leading to the ME, MES, MS, CE, EE, and PhD degrees. For further information and details, see individual departmental sections of this catalog.

General Engineering Courses (Engr)

1010. Introduction to Engineering Design. Introduction to engineering design, problem solving, and computer application skills. Orients students to college programs, academic advising, student services, professional societies, ethics, and engineering careers. (2F,Sp)

2000. Engineering Mechanics Statics. Force and position vectors; equilibrium of particles; rigid bodies; equivalent system of forces; equilibrium; free body diagrams; static analysis of trusses, frames, and machines; centroids and centers of gravity; friction; and moments of inertia. Prerequisites: Math 1210, 1220. (2F,Sp,Su)

2020. Engineering Mechanics Dynamics. Equations of motion, kinetics of particles, kinetics of rigid bodies, work and energy, impulse and momentum, three-dimensional kinematics, and vibrations. Prerequisites: Engr 2000, Math 1210, 1220. (3F,Sp,Su)

2040. Strength of Materials. Stress, strain, and deflection due to axial loads; moment and torsion; shear and moment diagrams; and equations of equilibrium and compatibility. Prerequisite: Engr 2000. (2F,Sp)

2200. Engineering Numerical Methods I. Introduction to use of digital computers and elementary numerical analysis, with emphasis on practical applications and software development using FORTRAN. Prerequisites: Math 1220 and Engr 1010; Math 2250 (taken concurrently). (3F,Sp)

2210. Engineering Numerical Methods II. Numerical solution techniques for solving ordinary and partial differential equations, emphasizing practical applications and software development using FORTRAN. Prerequisite: Engr 2200. (2F,Sp)

2930. Special Problems. Independent or group student study of engineering problems not covered in regular course offerings. (1-18F,Sp,Su)

College of
Family Life

Dean: *Bonita W. Wyse*
Office in Family Life 203B, (435) 797-1538

Associate Dean for Academic Affairs: *Ann M. B. Austin*
Associate Dean for Extension: *Leona K. Hawks*

FAX (435) 797-3845
E-mail famlife@flcl.usu.edu
WWW http://www.usu.edu/~famlife/

The College of Family Life has the following departments and areas of specialization:

Family and Human Development
- Family and Human Development
  - Family/Community Services Emphasis
  - Human Development Emphasis
- Early Childhood Education[1]
- Gerontology Certificate

Human Environments: Apparel Merchandising, Interior Design, Consumer Sciences, and Family and Consumer Sciences Education
- Family and Consumer Sciences Education
- Family and Consumer Sciences
  - Family Finance Emphasis
- Apparel Merchandising
- Interior Design

Nutrition and Food Sciences[2]
- Nutrition and Food Sciences, with emphases in Food Science, Food Technology Management, Public Health Nutrition, Dietetics, Nutrition Science, and Culinary Arts/Food Service Management

Mission and Goals

The College of Family Life views the family as the major source of nurturance, protection, and support for the individual. The mission of the College of Family Life is to create and extend knowledge and technology for the solution of critical problems confronting individuals and families living in diverse and changing physical, social, economic, political, cultural, and technological environments. The mission of the college is based on the belief that humans can successfully develop and manage relationships with each other and with their near environments to improve the quality of life.

The College of Family Life has the following goals:

1. To provide professional programs of teaching, research,

[1]Jointly administered with the Department of Elementary Education in the College of Education.

[2]Jointly administered with the College of Agriculture.

extension, and service with a focus on the interaction of human beings with their near environments, emphasizing in-depth study of reciprocal effects (physical, biological, social, psychological, economic, cultural, and aesthetic).

2. To provide quality professional preparation for students enrolled as majors within the college.

3. To provide courses of general educational value to University students interested in improving their ability to function effectively as individuals, marital partners, homemakers, parents, and family members in a variety of environments.

4. To provide programs that will enhance lifetime health and quality of life.

5. To undertake research that will increase knowledge, improve technology, and strengthen marriage/family life, and to enhance human dignity and the quality of life for many diverse social groups.

6. To provide scientifically based educational programs through Utah State University Extension to meet the needs of Utah Citizens.

7. To provide lifelong and continuing education opportunities, which extend and apply across the life span, to the citizens of Utah.

8. To add an international dimension to the college's programs and courses; to promote participation of faculty in those areas in which their expertise and knowledge can provide significant input into the solution of world problems affecting individuals, families, and environments.

9. To participate in University and national programs related to diversity, pluralism, and equal opportunity.

The ultimate goal of family and consumer science units in higher education is to strengthen the preparation of individuals who serve in family and consumer-oriented careers. The College of Family Life is accredited by the American Association of Family and Consumer Sciences.

Degrees

Degrees offered in the College of Family Life include the Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Nutrition and Food Sciences; and PhD in Family Life. The Family Life PhD can be earned with a specialization in Family and Human Development or in Human Environments.

Admission Requirements

Students accepted in good standing by the University are eligible for admission to the College of Family Life.

Academic Requirements

The University requirement of 30 credits of University Studies includes 6 credits of Communications Literacy. This requirement may be filled by completing Engl 1010 and Engl 2010. The 1000-level requirement is waived if the student scores 29 or higher on the English section of the ACT Exam, receives a 3 or higher on the English Advanced Placement Exam, or scores 500 or higher on the English section of the CLEP test

Academic requirements vary as a function of each department's standards and policies. It is the responsibility of the student to be informed about departmental requirements and regulations. For complete information, consult with departmental adviser.

The number of credits required for a major will be specified by area of concentration, subject to minimum University requirements.

Graduate Programs

All departments within the College of Family Life offer a graduate program. For more detailed information, see the *Graduate Programs* sections included in this catalog with the text for each of the Family Life departments.

Family Life Course (FL)

1100. Critical Issues in Family Life. Introduction to the departments and areas of study in the College of Family Life. Emphasizes how scholars in the individual areas, working together, address critical social issues. (2Sp)

College of
Humanities, Arts and Social Sciences

Dean: *Stan L. Albrecht*, Office in Main 338, (435) 797-1195
Associate Dean—Academics: *Joyce A. Kinkead*, (435) 797-1706
Associate Dean—Administrative Affairs; and Co-director, Center for International Studies: *R. Edward Glatfelter*, (435) 797-1196
Associate Dean—Extension: *David L. Rogers*, (435) 797-1255
Co-director, Center for International Studies: *Yun Kim*, (435) 797-1231
Director, Science/HASS Advising Center: *Mary E. Leavitt*, Office in Student Center 304, (435) 797-3883
Supervisor, College Graduation and Academic Services: *Jennifer W. Tingey*, Office in Student Center 304, (435) 797-4029
Director, Liberal Arts and Sciences Program: *Ann Leffler*, Office in Main 338E, (435) 795-1195

The College of Humanities, Arts and Social Sciences has the following departments and programs:

Aerospace Studies
Art
Asian Studies
Communication
English
History
Intensive English Language Institute
Landscape Architecture and Environmental Planning
Languages and Philosophy
Liberal Arts and Sciences Program[1]
Music

[1]Jointly administered with the College of Science.

Political Science
Sociology, Social Work and Anthropology
Theatre Arts
Undeclared

A listing of majors and degrees can be found under each department or program.

Within the College of Humanities, Arts and Social Sciences are found those departments which provide career preparation in some of the most interesting and vital academic fields. The study of society, the governing of society and its history, communication in a number of languages, the various aspects of culture—all these appeal to an increasing number of undergraduate and graduate students. Many train for careers in these fields; more—scientists, engineers, etc.—take courses to broaden their horizons and add interest to their lives.

It is probably fair to say that the social trend is toward an awareness that while material things are important they are not enough for a full life. For this, the individual may turn to literature, art, music, and theatre. Concern with environmental problems may lead the student to an investigation of landscape architecture. The complexities of modern life necessitate an understanding of the social sciences and history. It is within the College of Humanities, Arts and Social Sciences that these needs may be met.

Admission and Graduation Requirements

Students accepted in good standing by the University are eligible for admission to the College of Humanities, Arts and Social Sciences. Because of limitations of faculty and/or space, a few departments within the college, such as Art, LAEP, and Sociology, Social Work and Anthropology, limit enrollment in their professional programs. See the departmental sections in this catalog and the department head for information regarding these limitations and/or requirements in addition to the University graduation requirements.

Undeclared

Coordinator: Mary E. Leavitt
Office in Student Center 304, (435) 797-3883

The chief function of the Undeclared program is the advisement of students who have not yet decided upon a major or area of specialization. Students in the Undeclared program typically work on their University Studies (General Education) requirements while exploring major options. This allows them to make progress towards overall degree requirements and provides them with extra time to make wise, informed decisions. Undeclared students are advised by counselors in the Science/HASS Advising Center until they choose a major.

Students who are enrolled in another department but feel they have chosen their major unwisely may transfer to the Undeclared program upon receiving permission from the dean of the College of Humanities, Arts and Social Sciences.

No degree is offered through the Undeclared program. Most Undeclared students are freshmen or sophomores. Typically, by the junior year, most students have selected a major and are involved in taking major courses. Students do not usually remain in the Undeclared program beyond 60 credit hours or past the end of the sophomore year.

Women's Studies

Program Coordination: College of Humanities, Arts and Social Sciences
Contact: Brenda Cooper, director, Animal Science 319C, (435) 797-3253

Women's Studies at Utah State University is a multidisciplinary program focusing on the role of gender in the everyday experiences of women and men. Students are provided with opportunities to examine the diverse experiences, perspectives, and contributions of women in the past, present, and future, both nationally and internationally. Specific courses examine the processes of gender role socialization, and the resulting cultural beliefs and stereotyped images of women from a variety of disciplines. As a result, students gain appreciation for the role of gender and its practical implications in their basic life experiences, thus preparing them to understand current and future changes in the roles of women.

Each semester, Women's Studies courses are taught by faculty members from several areas throughout the University, including Anthropology, Communication, English, Health and Physical Education, History, Natural Resources, Political Science, Psychology, Special Education, and Sociology. Throughout the year, several special topics courses are offered, and many courses also offer Honors and graduate sections. Internship hours are available for work related to women's issues. To meet student needs, new courses are continually developed and offered.

Students may enroll in individual courses or apply coursework toward either a minor in Women's Studies or an Area Studies certificate.

Further information may be obtained from the director (Animal Science 319C) or the Science/HASS Advising Center (Student Center 304).

Mountain West Center for Regional Studies

Director: Clyde A. Milner, II
Program Coordinator: Jane Reilly
Office in Main 303, (435) 797-3630

The Mountain West Center for Regional Studies gathers scholars, departments, and resources of Utah State University to facilitate an interdisciplinary approach to regional studies. The center is founded on three assumptions: that the humanities are essential to the fulfillment of the University's mission, that regional studies make possible a better understanding of the values and assumptions that shape society, and that such studies are strengthened by communication and cooperation among academic departments.

The center brings together scholars and students from history, folklife and folklore, anthropology, the fine arts, and literature. It develops programs, administers scholarships, and provides support for research on the Mountain West. It makes possible symposia, publication, interpretation, preservation, public outreach, and graduate student training in the humanities.

The cooperating programs of the center include American Studies, the David and Beatrice Evans Biography and Handcart Awards, the Fife Folklore Program and Archives, the Nora Eccles Harrison Museum of Art, the Ronald V. Jensen Living Historical Farm, the Merrill Library Special Collections, the Utah History

Fair, the Utah State University Anthropology Museum, the Utah State University Press, *Western American Literature*, the *Western Historical Quarterly*, and the Western Writers' Conference.

Science/HASS Advising Center

Director: Mary E. Leavitt
Associate Director: Jennifer W. Tingey
Adviser: Irene B. McInerney
Adviser: Jill Hoffmann
Adviser: Lynne M. Slade
Office in Student Center 304, (435) 797-3883

The Science/HASS Advising Center is a campus office designed to provide academic advising for students in the College of Science and the College of Humanities, Arts and Social Sciences. Academic advisers counsel these students in the University Studies (General Education) requirements and in the Area Studies Certificate in the Liberal Arts and Sciences program (LASP).

Academic advising is provided through the center to all Liberal Arts and Sciences majors. Undeclared students also are advised in the center, with special emphasis on major exploration and career counseling. In addition, the Study Abroad programs, which provide students with opportunities to explore educational pursuits abroad, and the USU Area Studies Program are located in the center.

Additional services include transfer credit analysis and academic services for the College of HASS. Liberal Arts and Sciences majors, Undeclared students, all HASS students, and students interested in the LAS certificate are particularly welcome to explore the various services of the center.

Center for International Studies

Co-Director: Yun Kim
Co-Director: R. Edward Glatfelter
Office in Main 335, (435) 797-1196

The Center for International Studies promotes and coordinates international academic exchanges between the University and institutions of higher education abroad. Major objectives of the center are: (1) to develop bilateral university linkage programs, (2) to facilitate faculty and student exchange programs, and (3) to promote collaborative research programs, joint seminars, workshops, and conferences. The center also serves as the University academic center for international studies curriculum offerings and the Certificate for International Development program.

Asian Studies Major and Minor

Program Director: R. Edward Glatfelter (HASS Dean's Office), Main 335, (435) 797-1196

Major. The Asian Studies major requires a minimum of 26 credits approved by the program director. The program must include 9 credits selected from the core courses and 8 credits of Asian Studies electives. The remaining 9 credits should be selected from the general electives, after consultation with the Asian Studies faculty adviser. In addition, 16 credits of an Asian language are required for graduation.

Minor. A minor in Asian Studies requires a minimum of 23 credits, including 9 credits selected from the core courses and 14 credits selected from the courses approved by the Asian Studies program director. In addition, at least 6 credits of an Asian language are recommended.

Core Courses (required minimum of 9 credits): Hist 3460, Soc 4710 (Asian Studies), Econ 5400, Geog 4200 (when region covered is Asian), PolS 3230, 3250, 4260.

Asian Studies Electives (minimum of 8 credits required for major): Hist 3480, Phil 4900 (when syllabus includes Asian philosophies), PolS 4220 (when syllabus includes Asian Conflicts), PolS 4470, 5210, Soc 4730, Engl 3320 (when syllabus includes Asian literature).

General Electives. For a listing of general electives, consult the Asian Studies program brochure.

Asian Languages. For listings of Asian language courses, see the section for the Department of Languages and Philosophy in this catalog (pages 268-277).

British and Commonwealth Studies Minor

Program Coordinator: Jeffrey Smitten (Department of English), Ray B. West 201, (435) 797-2733

The minor in British and Commonwealth Studies, sponsored jointly by the English and History departments, allows undergraduates to experience interdisciplinary study and broaden their intenational perspectives. Students engage in interdisciplinary study by doing extended work outside their home departments, while at the same time integrating their study around a single area. They enhance their international experience by deepening their knowledge of the British Isles and by expanding their knowledge of British culture through its contact with other world cultures in the imperial, Commonwealth, and post-colonial eras. This minor requires a minimum of 18 credits. The program selected must be approved by the coordinator of the British and Commonwealth Studies Minor *at least one year prior to graduation.* Alternatives to this program are possible, but any alternative must be approved by the coordinator. **Courses used to fulfill requirements for the English or History majors *may not* be used for the British and Commonwealth Studies minor.**

All students must complete Engl/Hist 2040 (British and Commonwealth Cultures), and must then complete four courses from the following: Engl 2120, 3310, 4300, 4320; Hist 3510, 4210, 4250, 4390. Finally, they must take *either* Engl 5920 (Directed Study) or Hist 4930 (Directed Readings), in which they complete an individual project on a topic concerning Britain and/or the Commonwealth.

Minor in Classics

Coordination: Mark L. Damen and Frances B. Titchener, Department of History
Office in Main 323, (435) 797-1290

An academic minor is available in the field of **Classical Studies** with three areas of emphasis: **Classical Civilization, Latin Language,** and **Greek Language.** From the ancient civilizations of the Mediterranean area are derived our government, literature, sciences, and laws. The classical world is the backdrop of the modern world. In association with various majors, the Classics Minor is designed to enhance intellectual abilities and practical skills.

Requirements for the three emphasis areas are as follows:

Classical Civilization: At least 21 credits from an approved list of courses.

Latin Language: 7 credits in upper-division Latin (3000-level or above), plus 6 credits from an approved list of courses.

Greek Language: 7 credits in upper-division Greek (3000-level or above), plus 6 credits from an approved list of courses.

Approved courses for the various minors are listed in the brochure titled *Classical Studies*. Brochures are available from the Department of History, Main 323.

Minor in International Development

An academic minor is available in the field of International Development. Core courses consist of one specified course each from the Economics, Political Science, and Sociology course listings. Elective courses may be selected from a geographical area of interest or from a wide range of related fields. This minor is very flexible and is a useful preparatory tool for development work. Although a foreign language is not required for the minor, it is strongly recommended that a student who is seriously considering working abroad have capability in a foreign language.

Approved courses and academic advisers for the minor in International Development are listed in the brochure titled *Area Studies in International Development*. Courses must be approved by the co-director of the Center for International Studies. For more information, contact R. Edward Glatfelter, co-director, Main 335, (435) 797-1196.

Humanities, Arts and Social Sciences Courses (HASS)

The College of Humanities, Arts and Social Sciences offers interdisciplinary courses which combine the humanities, arts, and social sciences and which are team taught, drawing faculty from among the departments of the college.

1250. Interdisciplinary Workshop. (1-5F,Sp,Su) ®

2250. Introductory Internship/Co-op. Introductory-level educational work experience in an internship or cooperative education position approved by the department and/or the College of Humanities, Arts and Social Sciences. (1-5F,Sp,Su) ®

4250. Advanced Internship/Co-op. Internship or cooperative education position of a more professional level, with increased complexity, approved by the department and/or the College of Humanities, Arts and Social Sciences. (1-15F,Sp,Su) ®

4910. Study Abroad. A semester study abroad experience through a student exchange program. Prerequisite: Approval from the Study Abroad Office. (1-20F,Sp,Su)

5250. Interdisciplinary Workshop. (1-5F,Sp,Su) ®

6250. Graduate Internship/Co-op. Internship or cooperative education position approved by the department and/or the College of Humanities, Arts and Social Sciences. (1-15F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

College of *Natural Resources*

Dean: *F. E. "Fee" Busby*
Office in Natural Resources 108, (435) 797-2445

Associate Dean: *John A. Kadlec*
Assistant Dean: *Charles W. Gay*
Academic Services Adviser: *Maureen A. Wagner*

FAX (435) 797-2443
E-mail nradvise@cc.usu.edu
WWW http://www.usu.edu/~cnr/cnr-home.htm

The College of Natural Resources has the following academic degree programs:

College of Natural Resources
Master of Natural Resources (MNR)

Fisheries and Wildlife Department
Aquatic Ecology (MS and PhD)
Fisheries and Wildlife (BS, MS, and PhD)
Fisheries and Wildlife Ecology (MS and PhD)

Forest Resources Department
Environmental Studies (BS)
Forestry (BS, MF, MS, and PhD)
Forest Ecology (MS and PhD)
Forest Management (MF)
Recreation Resource Management (BS, MS, and PhD)

Geography and Earth Resources Department
Geography (BS, BA, MA, and MS)

Rangeland Resources Department
Range Ecology (MS and PhD)
Range Science (BS, MS, and PhD)

Watershed Science Unit
Watershed Science (BS, MS, and PhD)

A list of degree requirements, emphases, and specializations can be found in the catalog section for each department.

The college also offers a Master of Natural Resources (MNR) professional degree. (See page 309 for further information.)

Interdisciplinary Programs. Many of the degree programs listed above are interdisciplinary to some extent. However, both the Environmental Studies and Watershed Science programs offer students the opportunity to develop broad interdisciplinary programs to meet their interests. Watershed Science builds on a strong science base; Environmental Studies has a greater emphasis on management and policy.

Minors in Natural Resources. The college offers minors in the following areas:

Environmental Studies
Fisheries and Wildlife
Geography/Geography Education
Range Science
Recreation Resources
Watershed Science

Requirements for the minors are found in the appropriate departmental sections of this catalog. Students should also consult a faculty adviser for the minor.

Objectives

The College of Natural Resources provides programs of study and professional training in the use and management of natural resources and the environment. These programs deal with renewable land and water resources and the management of these resources and their ecosystems. Forests, rangelands, wildlife, fisheries, watersheds, and recreation resources comprise the natural resources and environmental areas in which the college has developed professional competence. The college's expertise in geography provides a link between the management of these resources and their value to our society and other cultures.

The College of Natural Resources programs and facilities provide exceptional opportunities for field experience. Forests and rangelands comprise more than 90 percent of the total Utah land area. The Wasatch-Cache National Forest and other areas of natural lands close to the USU campus provide unlimited study projects and opportunities for demonstration. Yellowstone and other national parks are within one day's driving distance.

Career Opportunities. The curricula of the college prepare men and women for positions with federal or state agencies, private-sector work in natural resources management and administration, and positions in education.

Summer Employment/Work Experience. Students are strongly encouraged to seek summer employment with faculty research projects or natural resource agencies to gain practical work experience and help refine career goals. Students should check with the College of Natural Resources dean's office in early January regarding summer employment opportunities.

Undergraduate Programs

Academic Policies

Admission. Freshmen accepted in good standing by the University are eligible for admission to the College of Natural Resources. Transfer students need a cumulative 2.5 GPA for admission to College of Natural Resources majors. Departments may impose additional requirements; refer to departmental sections for information.

Students will make more satisfactory progress in natural resources majors if they have had two years of high school algebra and coursework in geometry, chemistry, physics, biology, and keyboarding. Four years of English are also desirable. Prospective students should realize that natural resources fields are highly technical professions, requiring not just field ability, but also high aptitude for scholarship. Success is also correlated with an ability to work well with people.

Natural Resources—Undecided. Students who have not yet decided on a specific natural resources major may be admitted to the college as undecided. Many of the courses taken during the freshman year are common to all natural resources majors; however, students are encouraged to select a major as soon as possible. Students in the undecided category should meet with the college academic adviser for assistance in planning their educational program and selecting a major.

Changes in Graduation Requirements. Students who can complete a baccalaureate degree within seven years of enrollment at USU can qualify for graduation by meeting (1) the General Education/University Studies requirements in effect when they initially enrolled at USU (or any revision of the University Studies requirements that has been in effect within seven years of their graduation) **and** (2) the major requirements in effect when they officially declared their major (or any revision of the major requirements that has been in effect within seven years of their graduation).

Students who have not completed the baccalaureate requirements within seven years of their initial enrollment at USU must have their General Education/University Studies and major requirements evaluated and approved by their department head and dean.

Academic Responsibility. The departments publish current major requirement sheets each year. It is the student's responsibility to know the current requirements and to consult with a faculty adviser in planning and completing his or her degree program.

Graduation Requirements. Students must satisfy all University, college, and departmental major requirements for graduation. This includes a 2.5 GPA in all courses taught by the College of Natural Resources. Refer to appropriate sections of this catalog for further details on graduation requirements.

Professional Organizations

Students are strongly encouraged to participate in professional organizations affiliated with their major. The College of Natural Resources has student chapters of the following professional societies:

American Fisheries Society
Gamma Theta Upsilon (Honorary Geography Society)
National Association of Environmental Professionals

Society of American Foresters
Society for Range Management
The Wildlife Society

Financial Aid

Scholarships. A number of scholarships are available to students in the college. The S. J. and Jessie E. Quinney scholars program offers ten four-year, $1,200 per year scholarships to entering and transfer undergraduate students in the College of Natural Resources. Interested high school seniors and transfer students are encouraged to write to the dean's office regarding these scholarships.

There are also many $200-$2,100 per year scholarships for continuing students. For details, see the *Financial Aid and Scholarship Information* section of this catalog (pages 33-34) or contact the dean's office.

Loan Funds. Several sources of funds are available on a loan basis to worthy upper-division students in the College of Natural Resources. Loans are made for short periods. Application should be made through the dean's office.

Research

The College of Natural Resources maintains an extensive program of research through its academic departments and the affiliated Jack H. Berryman Institute, Center for Disturbance Ecology, USDA/APHIS Predator Project, USDA Aquatic Ecosystem Monitoring Center, Utah Cooperative Fish and Wildlife Research Unit, and USU Ecology Center. Part-time employment opportunities are often available for undergraduates in college research programs.

Graduate Programs

The college offers graduate study programs leading to the MA, MF, MNR, MS, and PhD degrees. See the appropriate departmental sections for information on their graduate programs.

Financial Assistance

Assistantships. Teaching or research assistantships are awarded through the departments. For further information, students should check with their department and major professor.

Fellowships. Fellowships and tuition waivers are awarded on a competitive basis. Incoming graduate students should apply through their major professor.

Scholarships. Students entering the Master of Forestry program may apply for the S. J. and Jessie E. Quinney scholarships. For details, contact the dean's office.

Loans. Short-term loans may be available to graduate students through the dean's office.

Natural Resources Courses (NR)

BSS 1010. Humans and the Changing Global Environment. Introduction to historical nature and extent of human environmental transformation at global and regional levels. Examination of how socio-economic, political, and scientific factors influence past and current perceptions, use and conservation of natural environments in Western and other cultures, and future options available. (3F,Sp)

BPS 1130. Physical Geography. Geographic analysis of physical processes and spacial distribution of natural elements (i.e., the atmosphere, hydrosphere, lithosphere, and biosphere). (3F,Sp,Su)

2220. General Ecology. Study of the interrelationships among organisms, humans, and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. Prerequisites: Biol 1210 and 1220. (3F,Sp)

BSS 2340. Natural Resources and Society. Examines human values, uses, and management of natural settings at the individual, community, and societal levels. Topics include: psychological responses to nature, history of U.S. park and natural resource management, environmental sociology and politics, and nature in non-Western cultures. (3F,Sp)

3000. Management of Natural Resources and the Environment. Addresses how people from diverse disciplines must integrate knowledge of biophysical, ecological, and socioeconomic processes to manage natural resources. Considers different approaches for managing the environment and emphasizes how diverse perspectives require interdisciplinary empathy, communication, and collaboration. Prerequisites: NR 1130, 2220, or instructor's permission. (4F,Sp)

QI 3600. Quantitative Assessment for Natural Resources. Overview of methods used to collect, organize, and interpret natural resource data. Includes sampling principles for estimation of population parameters, attributes of geographical information systems, and hypothesis testing. Prerequisites: Stat 2000, Math 1050, computer literacy. (3F,Sp)

4000. Natural Resources Policy and Economics. Introduction to natural resource policy and economics. Policy components include models, processes, participants, laws, and tools for decision-making and policy implementation. Economics components include theory, interest calculations, financial analysis, nonmarket valuation, and regional impact analysis. (3Sp)

5000. Ecosystem Management. Project-based, capstone course for natural resources majors. Students work in interdisciplinary team to develop ecosystem management assessment for an actual landscape. Involves landscape scale planning and the integration of biological, physical, and human dimensions. Prerequisites: NR 4000 and senior standing. (3Sp)

5110. Environmental Education. Covers teaching about the environment, and using the environment and the natural world to teach other subjects, with a strong emphasis on participation and on practicing teaching techniques. (3Sp)

5200. Modeling Biological Systems. Basic techniques of mathematical and computer simulation applied to a wide variety of biological systems: ecology, physiology, agroecosystems, and cell biology. Model formulation, validation, sensitivity and stability analysis, stochastic systems. Prerequisites: Math 1220, Stat 3000, programming experience. (3F)

6430. Natural Resource and Environmental Policy Cornerstone Seminar. Interdisciplinary, team-taught cornerstone course for the Natural Resource and Environmental Policy Graduate Certificate Program. Introduces different disciplinary

perspectives for analyzing natural resource and environmental policies and decision-making processes. Helps students understand the role of science in policy-making and how to integrate information from contentious perspectives. (3Sp)

6440. Natural Resource and Environmental Policy Seminar. Series of invited speakers address variety of natural resource and environmental policy issues. Attended by students in the Natural Resource and Environmental Policy Program. (1F,Sp)

6450. Natural Resource and Environmental Policy Presentation. In their last year of graduate school, certificate candidates make a presentation on policy dimensions of thesis or dissertation, as part of this student seminar series. Students receive one semester credit for this presentation. (1F,Sp)

College of *Science*

Dean: *James A. MacMahon*
Office in Science Engineering Research 101, (435) 797-2478

Associate Dean: *Antone H. Bringhurst*
Associate Dean for Undergraduate Affairs: *Kandy Baumgardner*
Development Director: *D. Jerome Davies*

FAX (435) 797-3378
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WWW http://www.usu.edu/~science/

The College of Science has the following departments and programs:

Biology
Chemistry and Biochemistry
Computer Science
Geology
Liberal Arts and Sciences Program[1]
Mathematics and Statistics
Physics
Cooperative Nursing Program

Degrees, emphases, specializations, and program descriptions are listed with the departments and the Nursing Program. In addition, there is a Center for Atmospheric and Space Sciences (CASS) and three interdisciplinary programs which involve the college. There is a separate listing describing the activities of CASS on pages 391-392. The Interdepartmental Program in Molecular Biology consolidates and provides emphasis for research and teaching related to molecules in biological systems. Students in the college majoring in Biology or Biochemistry can receive graduate degrees with a molecular biology specialization. The Department of Biology participates in the Interdepartmental Graduate Program in Toxicology. This program offers research opportunities leading to MS and PhD degrees within several specialties of toxicology. The college also participates in an interdisciplinary, interdepartmental program in ecology which operates under the Ecology Center. The Ecology Center brings distinguished scientists to campus, fosters faculty research, and enhances graduate education in all areas of ecology.

Objectives

USU has always given a high place to the sciences. Modern civilization is based on science, most facets of which are fundamental in a land-grant university.

Opportunities for rewarding careers are excellent in the fields of science. These opportunities exist in education, research, conservation, service, and industry.

The curricula of the science departments are designed to achieve five purposes:

First, they serve all students. No college graduate can be considered educated without an appreciation of scientific principles.

Second, the college trains teachers of science at all levels of education. Highly competent teachers are absolutely essential to the continued well-being and development of society.

Third, students are prepared to take positions in industry and business in a highly technological world.

Fourth, education is provided in the health fields both at the preprofessional and entry level. The college has excellent programs in predental and premedical education with an exceptional record of placing students in dental and medical schools. Undergraduate degrees in the various departments of the college can be tailored to include predental and premedical training. Other programs prepare graduates to enter the health profession directly upon graduation.

Fifth, the College of Science educates research scholars in many fields of science. This is accomplished by completing a sound undergraduate degree in the field, followed by years of graduate specialization.

Students planning to enter the sciences are urged to discuss their plans and goals early with advisers, who are available in each academic department. Basic coursework in mathematics, chemistry, physics, and computer science is essential to most areas of science.

Admission Requirements

Students accepted in good standing by the University are eligible for admission to all departments in the College of Science. Students majoring in Computer Science must qualify for advanced standing status on the basis of their academic performance. Specific details are given in the Computer Science section of this catalog (see page 167).

College of Science Core Requirements

Mathematics Requirement. All bachelor degree candidates in

[1]Jointly administered with the College of Humanities, Arts and Social Sciences.

the College of Science must complete one year of calculus, consisting of Math 1210 and 1220. In some degrees or options within degrees, the second semester of calculus may be replaced by Stat 3000. The substitution will be for specific degree programs, and not by student choice.

Science Requirement. Every bachelor degree candidate in the College of Science must complete a year-long sequence outside of his or her major department. The approved sequences are: (1) Biol 1210, 1220; (2) Chem 1210, 1220; (3) Geol 1150, 3200; (4) Phyx 2110, 2120; and (5) Phyx 2210, 2220.

Science Major

A beginning freshman student who wishes to major in science, but who has not selected a specific major, may register in the college as a Science Major. A course of study will be developed that will attempt to maximize transfer into the various departmental majors in the college. Students in the Science Major will be required to transfer to a departmental major after one year of study.

Scholarships

Each year, the college offers a four-year scholarship to an outstanding freshman entering the University. The scholarship consists of up to 8 semesters of tuition waivers plus $2,000 given over four years ($500 per year). The scholarship is awarded on the basis of performance on a College of Science exam, ACT scores, and grades received in high school. The College of Science Scholarship exam is given at the time of the University Scholar Competition. Other scholarships are available through some of the departments in the college (see pages 34-36).

Graduate Assistantships and Fellowships

Excellent graduate assistantships and fellowships are available in all departments. Assistantships are available both for teaching and research. Applications should be made directly to the department concerned. For more information, see the *Graduate Financial Assistance* section of this catalog (pages 59-60).

Graduate Programs

Graduate programs leading to the MS degree are available in each department in the college. In addition, the Department of Mathematics and Statistics offers a MMath (Master of Mathematics) degree. The departments of Biology, Chemistry and Biochemistry, Mathematics and Statistics, and Physics offer programs leading to the PhD degree. See the department sections in this catalog for more information on these programs.

Liberal Arts and Sciences Program

The College of Science, in cooperation with the College of Humanities, Arts and Social Sciences, sponsors a Liberal Arts and Sciences Program (LASP). LASP promotes integrated learning across the life sciences, humanities, physical sciences, arts, and social sciences. All USU students are welcome in LASP. The LASP Area Studies Certificate, along with the LASP minor and major, are described on pages 278-279.

Science/HASS Advising Center

The Science/HASS Advising Center is a campus office designed to provide academic advising for students in the College of Science and the College of Humanities, Arts and Social Sciences. Academic advisers counsel these students in the Area Studies Certificate in the Liberal Arts and Sciences Program (LASP).

Honors Program

Several departments in the college participate in the University Honors Program by offering special honors courses and by sponsoring an option for graduation with departmental honors.

Undergraduate Research

The sciences provide an ideal setting for research. Many departments within the College of Science provide opportunities for undergraduate students to participate in research activities. Interested students should discuss this option with their academic adviser.

Science Course (Sci)

4300. Science in Society. Investigation of interactions between current scientific topics and societal goals and concerns. Intended as a capstone course for science teaching majors. Prerequisite: Senior standing and consent of instructor. (2F,Sp)

Instructional Units and Programs

School of
Accountancy

College of Business

Head: Ernst & Young Professor *Clifford R. Skousen*, governmental, international, managerial, financial
Office in Business 511, (435) 797-2331

Associate Head and Director, Accounting Graduate Programs: Thiokol Corporation Professor of Accounting *James W. Brackner*, auditing, cost, financial, ethics, managerial, controllership

Director of Research: Arthur Andersen Alumni Professor *Richard L. Ratliff*, auditing, financial, internal audit, principles

FAX (435) 797-1475
E-mail accounting@b202.usu.edu
WWW http://www.usu.edu/~account

Larzette G. Hale Professor *Frank A. Condie*, education, financial, tax, social; **Professor** *I. Richard Johnson*, financial, managerial, advanced, agency; **Richard C. And Vera C. Stratford Professor** *David H. Luthy*, financial, managerial; **Arthur Andersen Executive Professor** *Jay H. Price, Jr.*, financial, governmental, theory, advanced; **Professor Emeritus** *Larzette G. Hale*, financial, theory, social; **Adjunct Professor** *M. Kay Jeppesen*, government, contract accounting and administration; **Associate Professors** *Richard L. Jenson*, managerial, systems; *Irvin T. Nelson*, cost, education, financial, managerial; **Assistant Professor** *E. Vance Grange*, education, financial planning, tax; **Adjunct Assistant Professor** *Dale Siler*, business law, tax; **Instructor** *Ralph L. Peck*, financial, tax, CPA review; **Temporary Instructors** *Jack W. Peterson*, financial; *Franklin D. Shuman*, cost, financial, managerial

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Accounting (MAcc), and Master of Business Administration with a specialization in Accounting (MBA-Accounting)

Undergraduate emphases: *BS or BA*–Accounting, Agribusiness, Business Information Systems, Economics, Finance, Human Resource Management, Management, Marketing, Personal Financial Planning, or Production. Many of these emphases qualify for a minor. A dual major in Accounting and Economics is available. **Graduate specializations:** *MAcc*–Information Systems, Financial/Audit, Taxation, or a general MAcc degree without specialization. An MBA with a specialization in Accounting is offered in the College of Business (see MBA-Accounting program).

Undergraduate Programs

Mission

The mission of the School of Accountancy at Utah State University is excellence in accounting education through teaching, research, and service. The school endeavors to provide high quality accounting preparation for professional careers to on-campus and extension students, to intellectually contribute to the field of accounting through the dissemination of meaningful research, and to render service. The school is dedicated to fostering economic and social progress, and to developing students into responsible and ethical citizens committed to active roles in their profession and service to society.

Objectives

The objective of the School of Accountancy is to provide high quality accounting preparation for professional careers in industry, public accounting, and other organizations. The undergraduate program is devoted to providing basic conceptual accounting and business knowledge, along with general education, as a well-rounded foundation for career development. The fostering of high quality student organizations is fundamental to the career-development process for on-campus programs.

The accounting curriculum is designed to help students prepare to meet changes in social, economic, and technological development. Academic course requirements for the bachelor's degree include general education coursework, as well as

supporting courses in mathematics, economics, business information systems, business communications, business administration, and accountancy. The program provides an opportunity to choose from a number of elective courses to broaden educational backgrounds and enhance employment opportunities.

Career Opportunities

Practice in the profession of accounting has become more complex, with computerized information and accounting systems becoming an integral part of the various accounting and business functions. University training is essential to prepare for high-level accounting careers in business, government, and public accounting.

Graduates of the accounting program find employment in a variety of industrial companies, nonbusiness and government agencies, and both large and small public accounting firms. Graduates hold all levels of positions within organizations, including supervisors, managers, partners, controllers, financial vice-presidents, and chief executive officers. Nonbusiness units and government agencies, such as the Utah State Auditors Office, the Federal Bureau of Investigation, and the Internal Revenue Service, provide jobs in many varied accounting functions.

Requirements

College of Business Requirements. All students majoring in accounting must satisfy the College of Business requirements, provided on pages 71-72. Academic advising about these requirements is available in the College of Business Student Service Center, Business 306.

General Instructions for all Accounting Majors. Since some accounting courses are not offered every semester and many have prerequisites, students should plan their program at least a year ahead.

Accounting Major Requirements. For a BS in Accounting, students must complete 120 credits, including at least 25 credits in accounting, and 51 credits outside the College of Business (see page 71). All accounting majors are required to complete the University Studies requirements (see pages 50-53), the College of Business Advanced Standing requirements (see page 72), and BIS 3500 (required for BIS minor) or CS 3500; BA 3400, 3500, 3700; Econ 3400; MHR 3110; MHR 4880 or 4890; Acct 3110, 3120, 3250, 3310, 3410, 4500, and 4510. In addition, accounting majors must select one of the following areas of emphasis.

Areas of Emphasis

(Those marked with an "*" qualify for a minor.)

Accounting. Select 6 additional accounting credits from the following: Acct 4900, 5100, 5210, 5220, 5410, and 5650. Acct 5210, 5220, and 5410 must be completed either prior to or as part of an MAcc or MBA-Accounting degree. Alternatively, Acct 6040 may be taken at the graduate level, instead of Acct 5210 and 5220. However, Acct 5210 and 5220 are recommended.

***Agribusiness.** Select 12 additional credits in economics and accounting from the following: Econ 2040, 4030, plus two additional classes from economics or accounting.

***Business Information Systems.** Select 12 additional credits in business information systems or computer science from the following: BIS 2300, 3100, 3330, CS 1700 or 3510.

***Economics.** Select 12 additional credits in economics and/or accounting from the following: Econ 4010 or 5010 *and* Econ 4020 or 5000, plus two additional classes from economics or accounting. If the two additional classes are selected from economics, requirements for a dual major in accounting and economics may be met (see *Dual Major* below).

***Finance.** Select 12 additional credits in business administration and/or accounting from the following: BA 4450, 4460, and two classes from: BA 4300, 4410, 4420, or 4430. (One additional accounting class may be substituted for one of the two BA classes listed in this group.)

***Human Resource Management.** Select 12 additional credits in MHR, Econ, or BIS from the following: MHR 3710, 4610, and two classes from the following: MHR 3810, 4620, Econ 5660, 5670, or BIS 4350.

***Management.** Select 12 additional credits in MHR from the following: MHR 3710, 3720, 3810, 3820, and 4720.

***Marketing.** Complete 12 additional credits in marketing and accounting as follows: BA 4510, 4530, 4540, and 4550. (One additional accounting class may be substituted for BA 4530 or 4540.)

Personal Financial Planning. Complete 12 additional credits in accounting and business administration as follows: Acct 5060, 5070, 5080, and BA 3460 or 4460.

***Production.** Select 12 additional credits in business administration and accounting from the following: BA 4720, and three classes from BA 3080, 4750, 4790, 5730 (one additional accounting class may be substituted for one of the BA classes listed in this group).

Dual Major

Accounting and Economics Dual Major. Select 12 credits in economics in addition to the classes required for an accounting major from the following: Econ 4010 or 5010, Econ 4020 or 5000, and two of the following: Econ 4310, 5100, 5110, and 5330.

Accounting Minor

Students with a major in an area other than accounting may qualify for an accounting minor by completing the following 6 classes (18 credits): Acct 2010, 2020, 3110, 3120, 3310, and 3410 or 4500. A 2.5 grade point average must be achieved for accounting classes taken.

Second Bachelor's Degree in Accounting

Students seeking a second bachelor's degree in accounting must be approved by the School of Accountancy, must achieve an accounting and overall grade point average of 2.5, and must complete the course of study listed above for an accounting major. Students working toward a second bachelor's degree may substitute Acct 6010 for Acct 2010 and 2020.

Beta Alpha Psi

The Delta Omega Chapter of Beta Alpha Psi, the national honorary and professional accounting fraternity, provides many professional accounting experiences for qualifying accounting students throughout their academic program.

Institute of Management Accountants

The student chapter of the Institute of Management Accountants (IMA) provides professional experiences in the area of management accounting. This organization is especially for students interested in careers in industry, not-for-profit organizations, governmental organizations, and accounting and business entrepreneurship.

Graduate Programs

The graduate programs provide greater breadth and depth in accounting, taxation, information systems, and management to develop a high level of understanding, skill, and leadership capability to enter professional accountancy and related business careers. The Master of Accounting (MAcc) and the Master of Business Administration-Accounting Specialization (MBA-Accounting), offered by the College of Business, qualify graduates to sit for the Certified Public Accountant examination.

Admission Requirements

See general admission requirements, pages 60-61. In addition, candidates are selected based on the combined consideration of their score on the Graduate Management Admissions Test (GMAT) and their grade point average from the previous 60 semester credits (90 quarter credits) completed. Generally, 200 times the GPA plus the GMAT score must total 1,150 or more. Additionally, for MAcc Programs, the minimum acceptable GMAT score is at the 40th percentile (about 480) and the minimum GPA is 3.0. A minimum acceptable GMAT score of 550 is required for the MAcc Program designed especially for nonaccounting undergraduate majors. In addition, scores for each section of the GMAT must be at least at the 40th percentile. For information about admission to the MBA-Accounting Specialization Program, see Admission Requirements for the MBA Program, page 130. Letters of recommendation, professional experience, professional certification, and leadership are also considered in admission decisions for all accounting graduate programs. Students may apply for admission to the graduate programs during their senior year of baccalaureate study. USU accounting students may take graduate courses during their last 30 credits of undergraduate study, provided prerequisite courses have been completed, they have applied for admission into a graduate program, and a split registration form is approved by the dean of the School of Graduate Studies. (See *Split Form Policy*, page 62.)

Students with an undergraduate degree in accounting which meets the USU undergraduate accounting program requirements have completed all of the preparatory work for graduate study. Students with less than the equivalent of the undergraduate program are expected to make up the deficiencies. The director of Accounting Graduate Programs will assist in necessary program scheduling. Students are encouraged to satisfy undergraduate deficiencies by taking equivalent graduate business administration, management and human resources, and economics core courses when possible.

Graduate students are expected to maintain an overall GPA of 3.0 to remain in the program.

Complete information relative to the details of the program and course scheduling is available from the School of Accountancy.

Graduate Degree Programs

MAcc for nonaccounting undergraduate majors (54 credits). For students who have undergraduate degrees in nonbusiness subjects, the MAcc degree requires the successful completion of the Integrative Pre-MBA Core (Accounting 6160, 18 credits), which is offered summer semester only, plus an additional 36 credits. Students with undergraduate degrees in business subjects may earn the MAcc in 36 credits. The 36 credits include: Acct 3110, 3120, 6020, 6030, 6040, 6350, 6500, 6510, 6610, and 9 credits of nonaccounting elective classes.

MAcc (other than tax emphasis) for students who have an undergraduate accounting major or equivalent (30 credits). The core classes required for this degree include: Acct 5410; Acct 6040, or Acct 5210 and 5220; Acct 6350, 6500, 6510, 6610; and BIS 6150. (Acct 5210, 5220, and 5410 may be taken as part of an undergraduate program.) A minimum of 15 credits must be in accounting. The remaining credits may be selected from any University classes, provided at least 6 additional credits are nonaccounting and no more than 9 credits are below the 6000 level. Three of these credits (one class) may be at the 3000 or 4000 level.

As part of the MAcc program, students may select from any approved elective courses or may select one of the following specializations:

Information Systems. Select three classes from BIS 3100, 3330, 4100, 5100, 5150, 5200, 5300, 5410, 6120, 6200, 6300, 6700, and 6750.

MAcc Taxation Specialization for students having an undergraduate accounting degree or equivalent (30 credits). The core classes required for this degree are: Acct 5410; Acct 6040, or Acct 5210 and 5220; Acct 6410, 6420, 6440, 6460; and BIS 6150. (Acct 5210, 5220, and 5410 may be taken as part of an undergraduate program.) A minimum of 15 credits must be in accounting. The remaining credits may be selected from any University classes, provided at least 6 additional credits are nonaccounting and no more than 9 credits are below the 6000 level. Three of these credits (one class) may be at the 3000 or 4000 level.

Alternatively, students may pursue one of the following emphases:

Personal Financial Planning. Select three classes from Acct 5060, 5070, 5080, and 6460. (Acct 5060, 5070, and 5080 are considered nonaccounting classes.)

Finance. Select three classes from BA 3460, 4410, 4420, 4430, 4450, 4460, 6420, and 6440.

MBA-Accounting

A student may receive the College of Business Master of Business Administration with a specialization in accounting by completing the MBA advanced core, 18 credits (see the MBA program description on pages 130-131 and 12 credits of

accounting courses. Of the 12 accounting credits, 9 must be reserved for graduate students (classes numbered above 6010) and 3 may be elected from 5000- or 6000-level classes. Accounting 6610, or any 6960 course in the College of Business, must be taken to satisfy the Graduate School research course requirement.

Students with an undergraduate degree in accounting or equivalent must have completed coursework in corporate income tax (Acct 5410) and advanced accounting (Acct 5210 and 5220, or Acct 6040), or must include these courses in their MBA program of study.

Students without undergraduate degrees in accounting may qualify for the accounting specialization in the MBA by completing Acct 3110, 3120, 6020, 6030, 6040, and one additional accounting course numbered above 6040. To qualify for this option, students must have a minimum GMAT score of 550 and score in at least the 40th percentile in each part.

Financial Assistance

Limited financial assistance is available in the form of President's Fellowships, Graduate School Fellowships, graduate assistantships, and special School of Accountancy scholarships. Applications for assistance should be made after the application for admission to the School of Graduate Studies is filed, but before March 15 of each year. Application forms are available from the School of Accountancy, and the awards are normally announced by May 15.

Professional Organizations and Activities

Graduate students are encouraged to participate in professional organizations, such as the USU chapters of Beta Alpha Psi (National Honor and Professional Fraternity) and the Institute of Management Accountants. The Federation of Schools of Accountancy, the American Institute of Certified Public Accountants, the Utah Association of Certified Public Accountants, and other professional organizations sponsor professional activities for accounting graduate students.

Accounting Courses (Acct)

1000. Business Orientation. Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (0.5F,Sp)

1050. Accounting Essentials. Overview of accounting concepts, with special emphasis on practical applications. Taught only as a special extension course as requested. (3)

2010. Survey of Accounting I. Survey of uses of accounting information by investors and creditors for decision making. Emphasis on basic accounting principles used to prepare, analyze, and interpret financial statements. Prerequisites: Completion of 20 credits of college work and 2.2 GPA. (3F,Sp,Su) ©

2020. Survey of Accounting II. Survey of uses of accounting information by managers for decision making, including planning, budgeting, and controlling operations. Emphasizes accumulation, analysis, and control of product and service costs. Prerequisite: Acct 2010. (3F,Sp,Su) ©

2250. Introductory Internship. Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. (1-9F,Sp,Su) ®

3110. Intermediate Accounting I. Study of accounting principles, theory, and practice relating to financial reporting of assets. Prerequisite: Acct 2020 or 6010 or 6160. (3F,Sp,Su) ©

3120. Intermediate Accounting II. Study of accounting principles, theory, and practice relating to liabilities, equities, and other contemporary issues. Prerequisite: Acct 3110. (3F,Sp,Su) ©

3250. Discussions With Business Leaders. Students attend Partners in Business Program seminar sessions to examine new methods for improving performance in organizations. Repeatable to a maximum of 1.5 credits. (0.5F,Sp) ®

3310. Management and Cost Accounting. Contemporary theory and applications in the accumulation, analysis, and interpretation of accounting information for internal decision-making and control. Prerequisite: Acct 2020. (3F,Sp,Su) ©

3410. Income Taxation I. Emphasis on Federal income taxation of individiuals. Introduction to tax research methods and taxation of corporations and partnerships. Prerequisite: Acct 2010. (3F,Sp,Su)

4250. Advanced Internship. Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. (1-9F,Sp,Su) ®

4500. Accounting Information Systems. Theoretical concepts underlying accounting systems' computerized support of business processes. Topics include accounting systems development, controls, security, and audit. Prerequisites: Acct 3110, BIS 2450, and BIS 3500 or CS 3500 or other approved programming course. (3F,Sp,Su)

CI 4510. Auditing Principles and Techniques. Fundamental principles and techniques of auditing and reporting of audits presented in the context of the audit logic sequence. Integrative applications emphasizing audits of organizational resources, processes, and systems. Also addresses ethics, legal environment, auditing standards, and fraud. (3F,Sp)

4900. Independent Research and Readings. Selected reading and research individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. (1-3F,Sp,Su) ®

4950H. Senior Honors Thesis/Project. Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (3Sp)

5050. Management Accounting Issues and Problems. Contemporary problems in management accounting, integrating issues in accounting, economics, finance, information systems, and management. Prerequisite: Senior-level accounting major or consent of instructor. (3Sp)

5060. Personal Financial Planning and Advising. Fundamental concepts and principles of personal financial planning for individuals. Prerequisites: Econ 1500, Math 1050, Acct 2010 or 6010. (3F)

5070. Retirement Planning. Concepts and principles of retirement planning, including retirement and benefit plans, deferred compensation, and investments. Prerequisites: Econ 1500, Math 1050, Acct 2010 or 6010. (3Sp)

5080. Estate Planning. Concepts and principles of estate planning for individuals, including goal identification, data gathering, forms of property ownership, documents, probate, and transfer taxes. Prerequisites: Econ 1500, Math 1050, Acct 2010 or 6010. (3Sp)

5100. Government Contract Administration. Provides basic information and description of the general environment and content of government contracts (primarily U.S. government contracts). Emphasis on the administration of and accounting for these contracts. (3Sp)

5210. Advanced Accounting I. Study of accounting principles and theory relating to

business combinations, foreign currency transactions, foreign affiliates, and segment and SEC reporting. Prerequisite: Acct 3120. (3F,Su)

5220. Advanced Accounting II. Study of accounting principles and theory relating to government and nonprofit organizations, partnerships, estates and trusts, and business insolvency. Prerequisite: Acct 3120. (3Sp,Su)

5410. Income Taxation II. Federal income taxation of partnerships, corporations, S-corporations, estates and trusts, and gifts. Prerequisite: Acct 3410. (3F,Sp)

5650 (d6650).[1] Accounting Topics and Issues. Selected contemporary accounting topics and issues, including the study of accounting for specialized industries. (1-3) ®

6010. Financial and Managerial Accounting. Introduction to financial and managerial accounting at the graduate level. Prerequisite: Bachelor's degree or admission to graduate school. (3F)

6020. Managerial Accounting and Control Systems. Study of contemporary issues and practices in managerial and cost accounting, computerized accounting information systems, internal control, and auditing. Prerequisites: Acct 2010 and 2020, or Acct 6010 or 6160. (3F)

6030. Federal Income Taxation. Study of federal income taxation of individuals, corporations, partnerships, estates, and trusts. Prerequisite: Acct 2010 or 6010 or 6160. (3F)

6040. Advanced Financial Accounting. Study of accounting theory and practice relating to business combinations, international operations and transactions, SEC reporting, and government and not-for-profit organizations. Prerequisite: Acct 3110. (3Sp)

6160. Integrative Pre-MBA Core. Integrates financial reporting, analysis, and markets; domestic and global economic and legal environments; creation and distribution of goods and services; and human behavior in organizations. Upon completion, students without undergraduate degrees in business are prepared to enter advanced MBA core. (18Su)

6180. Intrasession MBA Workshop. Intensive workshops designed to enhance the MBA experience. (0.5-1) ®

6250. Internship in Accounting. Graduate-level internship experience in accounting functions within industry, government, and public accounting firms. Repeatable to maximum of 6 credits. (1-6F,Sp,Su) ®

6350. Advanced Managerial Accounting. Contemporary theories and applications of managerial accounting in planning and controlling operations. International and ethical accounting issues are addressed. Case studies involving a variety of organizational structures are used. Prerequisites: Acct 2010 and 2020, or Acct 6010 or 6160. (3F,Sp)

6410. Tax Research and Procedures. Methods of researching tax problems, case studies in tax administration, civil procedures and penalties, professional responsibility, and tax ethics for the tax practitioner. Prerequisites: Acct 3410 and 5410; or Acct 6030. (3F)

6420. Taxation of Corporations and Shareholders. Concepts and principles governing the taxation of corporations and shareholders. Effect of taxes on corporation formation, capital structure, distributions, liquidations, and reorganizations. Prerequisites: Acct 3410 and 5410; or Acct 6030. (3Su)

6440. Taxation of Partnerships, Estates, and Trusts. Concepts and principles governing the taxation of partnerships and partners and estates, trusts, and beneficiaries. Uses of partnerships and trusts in tax planning. Prerequisites: Acct 3410 and 5410; or Acct 6030. (3F)

6460. Tax Topics. Topics of current interest to tax professionals. Prerequisites: Acctg 3410 and 5410; or Acct 6030. (3Su)

6500. Advanced Accounting Information Systems. Contemporary issues in accounting information systems, including emerging information technologies, systems evaluation and selection, and computer-based audit and security. Prerequisite: Acct 4500 or 6020. (3Sp,Su)

6510. Financial Auditing. Application of generally accepted auditing standards to accounting systems. Some study of auditing theory and current issues, and an introduction to statistical auditing. Prerequisite: Acct 4510 or 6020. (3F,Sp)

6550. Professional Accounting Cases and Problems. Cases and problems relating to professional accounting practice and theory. Prerequisites: Acct 3120; Acct 5210 and 5220, or Acct 6040; Acct 3410 and 5410, or Acct 6030. (3Sp,Su)

6610. Accounting Theory and Research. Analytical approach to understanding the financial reporting environment. Integration of accounting theory and practical research methodology in the resolution of financial reporting problems. Prerequisite: Acct 3120 (may be taken concurrently). (3Sp,Su)

6650 (d5650). Accounting Topics and Issues. Selected contemporary accounting topics and issues, including the study of accounting for specialized industries. (1-3) ®

6900. Independent Reading and Research. Independent work in accounting areas: theory, cost, auditing, taxation, and other areas with accounting faculty approval. (1-3F,Sp,Su) ®

6960. Professional Paper. A paper of professional quality prepared by the student. Designed to demonstrate the ability to complete a major business related project and to effectively present the results. (1-3F,Sp,Su)

6990. Continuing Graduate Advisement. Continuing enrollment at the University required after completing coursework. (1-3) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of

Aerospace Studies

College of Humanities, Arts and Social Sciences

Head: Professor and Lt. Colonel *Johnny Hays*
Office in Military Science 107, (435) 797-8723

Assistant Professors *Major Scott Parkhurst, Major Victoria L. Rondeau*

FAX (435) 797-8733
E-mail afrotc@hass.usu.edu
WWW http://www.usu.edu/~afrotc

Undergraduate Programs

Objectives

Air Force ROTC provides educational experiences that develop skills and attitudes vital to the career of an Air Force officer. The purpose of the course is to give an understanding of the mission and the global responsibilities of the United States Air Force. The academic phase develops background in national and international affairs to help understand and evaluate world events. In addition, the curriculum includes experiences designed to stimulate and develop an interest in the Air Force (e.g., orientation flights and visits to Air Force bases); opportunities to apply the principles of leadership, human relations, management, and staff work in practical situations; and other related experiences.

Requirements

Physical Fitness and Medical. All students must meet the physical fitness and medical standards for general military service.

Age Limitations. To qualify as a pilot or navigator, students must be able to finish the aerospace studies program and graduate from the University before age 26 1/2 years. Other students must complete the military program and graduate from the University prior to reaching the age of 30.

Academic Requirements. Successful completion of the following courses is required for commissioning: AS 3010, 3020, 3110, 3120, 4010, 4020, 4110, and 4120. In addition, when entering the final two years, a student must agree to accept an Air Force commission for four years, if it is offered, and to serve on active duty, if directed to do so. Upon initial enrollment at the University, students should schedule Aerospace Studies classes to be completed simultaneously with requirements for a bachelor's degree.

Although the AFROTC program is designed primarily for the student to complete in four years, all requirements for commissioning may be completed in only two years. Students interested in the two-year program should apply prior to the December which precedes their final two years of college. Screening of candidates for the two-year program will conform to the same requirements as for selecting advanced students in the four-year program. Prior to formal enrollment in the two-year program, each student must successfully complete six weeks of field training. The course of instruction is the same as that required for the four-year program, which includes a four-week summer field training session, with the classwork being covered in two additional weeks of field training.

Minor. A minor in Aerospace Studies will be awarded upon completion of commissioning requirements.

Veterans. A veteran may apply for the AFROTC program if he or she can complete the program prior to reaching age 30. The general military course (first two years) may be waived for prior military service. However, veterans must successfully attend field training prior to taking AS 3010, 3020, 3110, 3120, 4010, 4020, 4110, and 4120. Veterans normally will be entered in the two-year program.

Scholarships and Financial Aid

Scholarships. AFROTC college scholarships are available on a competitive basis. These scholarships pay tuition, fees, textbook allowances, and $150 per month nontaxable allowance. High school seniors should normally apply for four-year scholarships early in the fall of their senior year. Scholarship recipients must complete English composition and mathematical reasoning course requirements as established by AFROTC.

Uniforms and Texts. All Air Force texts and uniforms are furnished at no expense to the student.

Miscellaneous Information

All Cadets. To meet the challenges, keep up with technological advancements, and explore the opportunities of the ever-broadening horizons in the aerospace age, officers possessing a variety of skills are required by the Air Force. These skills cover the exact sciences and social sciences, but are not limited to these study areas. After being called to active duty, individuals will serve four years. Interested students should contact the AFROTC Department for information on the Air Force specialist fields related to their academic major.

Delay of Entry on Active Duty. If cadets complete the AFROTC program and receive commissions, they may request a delay in call to active duty if they desire to continue studies toward a graduate degree. The length of the delay depends upon current AFROTC regulations. Students entering flight training must do so before reaching 26 1/2 years of age.

Summer Training. (a) Field Training (six weeks) is a prerequisite for cadets entering the AFROTC two-year program. Training will be given at an Air Force base and will last for six weeks. Up to ten university credits may be granted for this training.

(b) Field Training (four weeks). All cadets in the four-year

program will attend a four-week summer training camp. Attendance at this camp is between the sophomore and junior year at a selected Air Force base. Up to six credits may be granted for this training.

Leadership Laboratory. A Leadership Laboratory period is required each week during the fall and spring semesters for each year of aerospace studies. Interested students should check the current *Schedule of Classes* for the Leadership Laboratory schedule.

Aerospace Studies Courses (AS)

1010, 1020. Introduction to the Air Force Today. Introduces the United States Air Force and Air Force Reserve Officer Training Corps. Air Force mission and organization, officership and professionalism, military customs and courtesies, officer opportunities, group leadership problems, and communication skills. Leadership Laboratory is mandatory for cadets. (1F) (1Sp)

1110, 1120. Leadership Laboratory I. Air Force customs and courtesies, drill and ceremonies, military commands, environment of the Air Force officer, and officer opportunities. AS 1110 must be taken concurrently with AS 1010; AS 1120 must be taken concurrently with AS 1020. (1F) (1Sp)

2010, 2020. The Air Force Way. Air Force heritage and leaders; introduction to ethics, leadership, and quality management; and a continued application of communication skills. Purpose of courses is to instill an appreciation for the development and employment of air power. Leadership Laboratory is mandatory for cadets. (1F) (1Sp)

2110, 2120. Leadership Laboratory II. Air Force customs and courtesies, drill and ceremonies, military commands, environment of the Air Force officer, and officer opportunities. AS 2110 must be taken concurrently with AS 2010; AS 2120 must be taken concurrently with AS 2020. (1F) (1Sp) ®

3010, 3020. Air Force Leadership and Management. Presents advanced leadership skills and Quality Air Force tools. As juniors and seniors, cadets given opportunity to practice these leadership skills and management techniques in a supervised environment. Leadership Laboratory is mandatory for cadets. (3F) (3Sp)

3060. Physical Fitness Training. Early morning workout to build stamina. Organized to keep cadets in shape to pass the Physical Fitness Test (PFT). Team instructed. (2F,Sp)

3110, 3120. Leadership Laboratory III. Advanced leadership experiences to include the planning and controlling of cadet corps activities, and the preparation and presentation of briefings and other oral and written communications. AS 3110 must be taken concurrently with AS 3010; AS 3120 must be taken concurrently with AS 3020. (1F) (1Sp)

3400. Field Training (4 Weeks). Students in the four-year program participate in four weeks of Field Training. Major areas of study include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions, Air Force environment, and physical training. Repeatable up to maximum credit. (1-4F,Sp,Su) ®

3600. Field Training (6 Weeks). Students in the two-year program participate in six weeks of Field Training. Major areas of study include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions, Air Force environment, and physical training. Repeatable up to maximum credit. (1-7F,Sp,Su) ®

4010, 4020. National Security Affairs/Preparation for Active Duty. Designed to give college seniors the foundation to understand military officer's role in American society. Overviews complex social and political issues facing the military profession. Leadership Laboratory is mandatory for cadets. (3F) (3Sp)

4110, 4120. Leadership Laboratory IV. Advanced leadership experiences to include the planning and controlling of cadet corps activities, and the preparation and presentation of briefings and other oral and written communications. AS 4110 must be taken concurrently with AS 4010; AS 4120 must be taken concurrently with AS 4020. (1F) (1Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Agricultural Systems Technology and Education

College of Agriculture

Head: Associate Professor *Gary S. Straquadine,* agricultural education/extension
Office in Agricultural Systems Technology and Education 101C, (435) 797-2230

Associate Head: Associate Professor *Bruce E. Miller,* agricultural systems and mechanization

FAX (435) 797-4002
E-mail garys@cc.usu.edu
WWW http://www.usu.edu/~asteweb/index.html

Professors *Robert L. Gilliland,* Vice President of Extension; *Weldon S. Sleight,* Associate Dean of Continuing Education; **Adjunct Professor** *Kevin C. Kesler,* 4-H and youth development programs; **Professor Emeritus** *Gilbert A. Long,* agricultural education; **Associate Professors** *Stephen E. Poe,* agricultural education/extension specialist, agricultural engineering; *Kathryn L. "Kitt" Farrell-Poe,* agricultural and environmental engineering/extension specialist; **Assistant Professors** *F. Richard Beard,* research and extension, agricultural engineering; *Guy W. Denton,* agricultural education/international extension education; *Richard M. Joerger,* agricultural education/applied technology education; **Lecturers** *Evan P. Parker,* agricultural technology and machinery management; *Daryl L. Reece,* agricultural engineering and equipment repair

Degrees offered: Bachelor of Science (BS) in Agricultural Education; BS, Bachelor of Arts (BA), Master of Science (MS) in Agricultural Systems Technology

Undergraduate emphases: *BS*–Agricultural Systems Technology, Business and Mechanization; **Graduate specializations:** *MS*–Agricultural Extension Education, Agricultural Mechanization, International Agricultural Extension, and Secondary/Postsecondary Agricultural Education

One-year Certificate and Associate of Applied Science (AAS): Agricultural Machinery Technology

Undergraduate Programs

Objectives

The programs offered in Agricultural Systems Technology and Education are for students who are preparing for positions as agricultural education teachers, as well as for positions in agricultural extension, agricultural mechanization, agribusiness, and agricultural production and management.

The facilities for these programs include laboratories with specially designed equipment for practical instruction in agricultural systems and mechanization, including computer application, agribusiness, agricultural buildings, engines, electricity, hydraulics, machinery, and repair welding.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Agricultural Systems Technology and Education are the same as those described for the University on pages 43-46. Students in good standing may apply for admission to the department.

Bachelor of Science in Agricultural Education. Preparation in Agricultural Education includes technical agriculture, economics, and business. Students selecting the teaching option will also enroll in principles and techniques of teaching courses.

Students interested in teaching agricultural production and processing, agricultural mechanics, horticulture, or natural resources will be guided into areas of their major interest. Agricultural backgrounds or summer agricultural experiences are necessary for teacher certification.

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education requirements, page 73). Approval for admission to teacher education is a prerequisite to enrollment in education and psychology courses. A 2.75 GPA is required for admission to the teacher education program.

Requirements for **Bachelor of Science in Agricultural Education** are listed briefly. For more detailed information on courses and the recommended sequence for taking them, see the major requirement sheet available from the Agricultural Systems Technology and Education Department.

The Agricultural Education major involves four teaching options, which correspond with the Utah agricultural education program model design. Students must complete the required 30 semester credits of University Studies (General Education) requirements. In addition, students must complete the following courses in preparation for teacher certification: InsT 3000; ScEd 3100, 3200, 4100, 4200, 5100, 5200, 5300; SpEd 4000; and ASTE 3240, 3300, 4250, 4300, 4400, 5500, 5600.

All students in the Agricultural Education major will complete a core of technical agricultural courses to include ASTE 1010, 3050, 3080; ADVS 1110; Biol 1110, 1210, 1230; Chem 1110; and Soil 3000. Students are required to designate a program emphasis for the following areas: Agricultural Production and Processing; Agricultural Systems and Technology; Horticulture; and Natural Resources. Approximately 50 credits in a technical agriculture specialization are required in each of the four program area choices. All students who seek an agricultural education teaching position in Utah are encouraged to complete the biological teaching endorsement, which includes an additional 15 credits.

Bachelor of Science in Agricultural Systems Technology (AST). This major has two options: *Business* and *Mechanization*. Preparation in either option includes technical agriculture, economics, and business. The mechanization option requires additional courses in technical electives and communication skills development.

The Bachelor of Science in Agricultural Systems Technology, **Business Option**, includes the following ocurses: ASTE 1010, 2200, 2830, 3030, 3050, 3080, 3090, 3100, 4100, 4900, 5260; Acct 2010; Chem 1110; Econ 1500, 2010, 2040; MHR 3110; Math 1060; Soil 3000; Stat 2300, and 24 credits of departmental electives. Students will complete a minor in Business or Agribusiness. Additional requirements in Animal Science, Plant and Soil Sciences, and Rangeland Resources must also be met. In addition, students must complete the University Studies (General Education) Requirements.

Bachelor of Science in Agricultural Systems Technology, **Mechanization Option**, includes the following courses: ASTE 1010, 2200, 2830, 3030, 3050, 3080, 3090, 3100, 4100, 4900, 5260; Acct 2010; Chem 1110; Econ 1500, 2010, 2040; MHR 3110; Math 1060; Soil 3000; and Stat 2300. Students must also fulfill University Studies (General Education) requirements and complete designated electives.

The **Associate of Applied Science Degree in Agricultural Mechanization** includes a minimum of 15 credits of University Studies (General Education) classes, 38 credits in Agricultural Mechanization, and 6-10 credits in business and related classes. Courses include: ASTE 1010, 1120, 1130, 1610, 1620, 1640, 2200, 2250, 2830, 2930, 3030, 3080, 3100, 3600, 3720, and 3730.

Agricultural Machinery Technology Certificate/Diploma. This one-year agricultural program meets the needs of persons interested in employment opportunities with agricultural dealerships and companies in the areas of parts and service, as well as with farm suppliers, feed and fertilizer agencies, corporate farms and ranches, and other related industries. The vocationally

oriented agricultural technology program includes a cooperative occupational experience placement at the end of the first year of instruction.

Requirements for the one-year program include: ASTE 1010, 1120, 1130, 1610, 1620, 1640, 3030, 3080. See major requirement sheet available from the department for more information.

Minor in Agricultural Systems Technology. A minimum of 18 credits approved by a faculty adviser are required.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. Applications will be considered throughout the year. However, students who wish to be considered for financial aid must apply by February 1 for the coming academic year. No application will be considered until all required information arrives at the office of the School of Graduate Studies.

Course Requirements

Master of Science. The MS program requires the completion of a minimum of 30 credits beyond the bachelor's degree. These credits must be approved by a supervisory committee. However, to optimize a student's academic experiences, 36 credits are recommended. A 10- to 15-credit core curriculum is required and includes courses in research/statistics and completion of either a Plan A thesis for 6 credits or a Plan B report for 3 credits. Students are also expected to select and complete an area of specialization. To complete all requirements, students should expect to be enrolled for a minimum of two semesters.

The following four specializations are available for the MS in Agricultural Education:

The **Agricultural Extension and Education** specialization provides a program for individuals interested in cooperative extension work. The curriculum for the program includes coursework related to managing people; planning, implementing, and evaluating programs to promote technology transfer (adult education); understanding research techniques relevant to agricultural education; and the managing of fiscal affairs.

Electives are selected from each of the following departments: Agricultural Systems Technology and Education; Animal, Dairy and Veterinary Sciences; Economics; Biology; Plants, Soils, and Biometeorology; Rangeland Resources; and Instructional Technology.

The **Agricultural Mechanization Systems** specialization allows for theoretical and applied study in the mechanical systems used in agricultural production, processing, and distribution. The curriculum for this program emphasizes coursework related to managing people; planning, implementing, and assessing systems used in the production and processing of agricultural products or services; and understanding research techniques used in agricultural systems technology. The remainder of the program is designed to be interdisciplinary, depending on student needs.

The **International Agricultural Extension** specialization was developed to prepare agriculturally educated people to perform administrative and supervisory roles in less-developed countries. The curriculum for this program includes coursework related to managing people; planning, implementing, and evaluating programs to promote technology transfer; and managing fiscal affairs. Electives are selected from each of the following departments: Agricultural Systems Technology and Education; Animal, Dairy and Veterinary Sciences; Economics; Biology; Plants, Soils, and Biometeorology; and Instructional Technology.

Research

The Utah Agricultural Experiment Station, a component of the College of Agriculture, supports graduate work in several areas of Agricultural Systems Technology and Education. Other state and federal agencies also support research in agricultural systems.

Financial Assistance

Both departmental and formal grant support are available to graduate students and are awarded on a competitive basis. Students requesting financial support should apply to the department.

Research assistantships are available through faculty members who have ongoing projects with the Utah Agricultural Experiment Station or who hold special research grants from the University, private companies, or state-federal agencies. Acceptance to pursue graduate study does not guarantee the student financial assistance.

Requirement Changes

Graduation requirements described in this catalog are subject to change. Students should check with their departments concerning possible changes.

Agricultural Systems Technology and Education Courses (ASTE)

1010. Introduction to Agricultural Systems Technology. Introduction to problem solving related to the areas of agricultural power and machinery, soil and water conservation, structures and animal environments, electrical circuits, and emerging technologies. (3F)

1120. Forage and Harvest Equipment. Fundamentals and principles in operations, adjustments, and maintenance of technologies utilized in agricultural forage and combine harvesting. (3F)

1130. Planting and Tillage Equipment. Fundamentals and principles in operation, maintenance, and repair of planting and tillage equipment. Exploration of different systems and their applications. (3Sp)

1610. Agricultural Engines and Electrical Components. Fundamental principles and components utilized in the production of power as applied in agricultural machinery. Diesel engines, as the power plants, and the DC electrical systems utilized with them will be overhauled using a systems approach. (6F)

1620. Agricultural Powertrains and Hydraulic Components. Fundamental principles and components utilized in agricultural machinery transmittal of power through drive trains and hydraulics. A systems approach to overhauling these components will be developed. (6Sp)

1640. Agricultural Equipment and Parts Retailing. Introduction to principles and

operation of computer software systems related to requisitioning, inventory control, and management within the agricultural machinery and small business industries. (3F)

2050. Technical Communication Principles in the Applied Sciences. Technical communications course designed for students in the Associate of Applied Science disciplines. Emphasizes business communication principles for effective transfer of information and problem resolution. Exploration and demonstration of electronic communication practices. (2Sp)

2200. Electricity in Agricultural Systems. Fundamentals of electricity (AC) as used on farms and ranches. Residential and commercial agricultural applications of the National Electric code. Electrical supply and service, distribution, proper grounding, and installation of components. (3Sp)

2250. Occupational Experience in Agriculture. Supervised occupational experiences for technical vocational preparation. (1-6F,Sp)

2710. Orientation to Agricultural Education. Students examine the framework of agricultural education, with a special emphasis on the nature of the programs, career opportunities, and the qualifications and preparation requirements of future agricultural educators. Students will spend 25-30 hours observing instruction in secondary classrooms. (2F,Sp) ®

2830. Agribusiness Sales and Marketing. Basic principles of agribusiness sales and marketing. After completing a series of self-assessments relating to sales, learning, and personality preferences, students learn to complete each major step of the sales process. (3F)

BSS 2900. Humanity in the Food Web. Provides broad overview of food systems in conjunction with detailed analysis of particular issues, such as different theories and supporting data on the domestication of plants and animals, the use of human labor, the development and operation of complex technologies, and the analysis of socioeconomic data on human population growth and well-being. (3F,Sp)

2930. Individualized Projects in Agricultural Mechanics. Basic skill preparation for employment in agricultural industry. (1-6F,Sp)

3030. Metal Welding Processes and Technology in Agriculture. Selection of ferrous and nonferrous welding techniques in agricultural applications. Welding, cold- and hot-working metal in agricultural construction and maintenance. (2F)

QI 3040. Fabrication Practices in Agricultural Buildings. Selection and use of agricultural building materials, including concrete and masonry, lumber, plywood, finishes, and fasteners. Application of hand and power tools and procedures in agricultural construction. (2Sp)

CI 3050. Technical and Professional Communcation Principles in Agriculture. Technical communication principles and practices used in the agricultural industry. Emphasizes technical writing of reports and correspondence using electronic information retrieval and presentation. Prerequisite: Engl 2010. (3F,Sp)

3080. Compact Power Units for Agricultural and Turfgrass Applications. Operation and application of agricultural and turfgrass equipment powered by internal combustion engines having less than 40 horsepower. Prerequisite: ASTE 1010. (3Sp)

3090. Computer Applications in Agriculture. Overview of computer systems and software currently used in agriculture. Emphasizes development of term project using spreadsheets. Word processing, file management, CAD, and computer ethics. Prerequisite: BIS 1400. (3F,Sp)

3100. Leadership Applications in Agricultural Science, Management, and Development. Study of leadership styles and their applications in development of agricultural programs for youth and adults. Emphasizes leadership and communication principles for effective community resource management in rural environments. Experiences provided in leadership styles, program planning, and meeting organization. (2Sp)

3200. Irrigation Principles and Practices. Introduction to planning principles for irrigation systems and farm water resource development. Layout of system components and coverage of practices common to the Intermountain West. (3F)

CI 3240. Teaching in Laboratory Settings. Basic principles of teaching students in laboratory settings. Overview of major concepts, considerations, and practices used for developing and evaluating agriscience curricula. Prerequisite: ASTE 2710. (3Sp) ®

3300. Clinical Experience I in Agricultural Education. In-school clinical observation experience. Students involved in observing management and assisting in teaching. Designed to provide familiarity with agricultural education classroom. (1F,Sp)

3500. Teaching Apprenticeship in Agricultural Education. Each student serves as an apprentice to professional agricultural educator. Students complete competencies leading to early preparation for student teaching. (2F,Sp,Su)

QI 3600. Management of Agricultural Machinery Systems. Management principles for evaluation and selection of agricultural complements for performance, optimization, economics, environmental impact, and long-term sustainable agricultural practices. Prerequisite: Math 1050. (3Sp)

3620. Managing the FFA and SAE Programs. Introduction to basic concerns, understandings, and practices needed to effectively advise an FFA chapter. Students learn appropriate philosophies and skills for operation of a comprehensive supervised agricultural experience program. (2Sp,Su)

3720. Electrical and Hydraulic Diagnosis. Agricultural equipment testing and diagnosis of electrical and hydraulic systems. Exploration of techniques for diagnosing malfunctions and related failures and the interrelationship of the systems. Development of a systems diagnosis method. Prerequisite: ASTE 1620 or approval of instructor. (3F)

3730. Auxiliary Systems Diagnosis. Application of theory, testing, diagnosis, and repairs of auxiliary systems, including air conditioning, analog, electronic monitoring, and GPS as utilized in agricultural equipment. Prerequisite: ASTE 3720 or approval of instructor. (3Sp)

3900. Special Problems in Agricultural Education. Students conduct short-term studies and/or literature review with critical analysis of special topics. Formal written reports required. Prerequisite: Approval of instructor. (1-6F,Sp,Su)

4100. Agricultural Structures and Environment. Overview of agricultural structures and environmental considerations related to livestock, livestock waste management, and commodity storage. Planning, layout, construction materials, concrete masonry, ventilation, insulation, and energy. (3Sp)

CI 4150. Methods of Teaching Agriculture. Introduction to basic practices of classroom teaching and program planning. Through participation in discussions, activities, and assignments, students refine their abilities to develop programs, diagnose the learner, prepare the instruction, and guide student learning. Prerequisites: ASTE 2710, 3240. (3F) ®

4250. Occupational Experiences in Agriculture. Supervised occupational experience for technical and professional preparation in teacher education and/or agricultural business. (3-9F,Sp,Su)

4300. Clinical Experience II in Agricultural Education. Continued in-school observation of agricultural education teaching. Requires student participation in teaching, management, and program development in agricultural education. (1F,Sp)

4400. Advising Applied Technology Education Student Organizations. Principles and practices for advising applied technology student organizations in secondary education. Examination of leadership organizations supporting applied technology education. Emphasis on program planning, leadership development, and evaluation. (1Sp)

4900. Senior Project Research and Creative Opportunity. Returning student

teachers work to strengthen their weaknesses in areas such as scaled drawing, cost estimating, machine shop practices, construction, and small engines. (1-6F,Sp,Su)

5100 (d6100).[1] Electrical Controls and Motors for Agri-Industrial Applications. Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. (3Sp)

5200. Assessment in Applied Technology Education. Principles and practices in assessing performance and development of applied technology students. Emphasizes testing and evaluation techniques used in applied technology education. (3Sp)

5260 (d6260). Environmental Impacts of Agricultural Systems. Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (3Sp)

5500. Agricultural Education Secondary Curriculum Seminar. Cooperative examination of considerations and processes for teaching secondary students. Reflection on the practice of teaching. Preparation for entry into the teaching profession. (2Sp) ®

5600. Agricultural Education Student Teaching in Secondary Schools. Students teach agriscience and technology courses in secondary and middle school settings under the guidance of clinical and Utah State University supervisors. (8Sp)

6000. Methods of Equipment Testing, Diagnosis, and Repair. Investigation and demonstration of methods and procedures for testing, troubleshooting, and diagnosis of tractors, power units, and all types of agricultural equipment. (3F)

6070. Program and Curriculum Development in Applied Technology Education. Program planning for locally applied curriculum design to meet student interests and community needs for applied technology teachers. (3F,Sp,Su)

6100 (d5100). Electrical Controls and Motors for Agri-Industrial Applications. Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. (3Sp)

6110. Applied Technology Education Program Planning and Evaluation. Program planning and evaluation. Study of strategies used in applied technology. Demonstration of manpower surveys and job analysis for curriculum development. (3F)

6130. Electrical and Hydraulic Component Testing, Diagnosis, and Repair. Involves supervision and demonstration of procedures for testing, diagnosis, and repair of all types of electrical and hydraulic components on modern agricultural equipment. (3F)

6140. Agricultural Development and Evaluation. Principles and strategies for developing, implementing, and evaluating agricultural technology and educational programs for U.S. and international organizations. (3Sp)

6170. Supervision and Administration of Extension. Study and analysis of principles and theories of supervision and administration as applied to Extension Service programs and rural development/agricultural extension operations. (3F)

6240. Strategies for Teaching Adults. Features contemporary strategies and guided practice for teaching adults in group and individualized learning settings. (3F,Sp,Su)

6250. Special Problems in Agricultural Systems Technology. A consideration of needs and special types of service in FFA, young farmers, and adult programs for applied technology teachers. (3F,Sp,Su)

6260 (d5260). Environmental Impacts of Agricultural Systems. Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (3Sp)

6300. Foundations of Adult Education and Program Evaluation. Addresses the context and providers of adult education. In addition, adult learning theories and participation models are examined. (3F)

6510. Principles and Practices of Extension Education. History, philosophy, and organizational structure of U.S. and international extension organizations, including programming models, teaching strategies, and accountability. (2Sp)

6600. Analysis of Machinery Management and Decision Making Processes. Involves the record keeping and analysis procedures for profitable decision making and machinery management related to modern production agriculture practices. (3Sp)

6700. Research Methods in Agricultural Systems. Introduction to research techniques used in agricultural systems. Includes research design, data gathering, and statistical analysis and interpretation. (3Sp)

6750. Agricultural Safety and Health: Issues and Decisions. Review of agricultural safety and health issues. Public and private concerns addressed through problem identification, data gathering, resolution, and evaluation. (3Sp)

6900. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

6970. Research and Thesis. (1-9F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Animal, Dairy and Veterinary Sciences

College of Agriculture

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Associate Head: Professor *Mark C. Healey,* immunoparasitology
Office in Veterinary Science and Bacteriology 202, (435) 797-1901

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WWW http://www.usu.edu/~advs/

Professors *Stanley D. Allen,* veterinary diagnostics, laboratory animal management; *Clell V. Bagley,* veterinary medicine; *Thomas D. Bunch,* cytogenetics, embryo biology; *Noelle E. Cockett,* molecular genetics, identification of genetic markers; *Roger A. Coulombe, Jr.,* veterinary toxicology, molecular biology; *Howard M. Deer,* pesticides, environmental toxicology; *Lyle G. McNeal,* sheep production, wool science; *Robert W. Sidwell,* virology; *Ross A. Smart,* veterinary diagnostic pathology; *Kenneth L. White,* reproductive physiology, developmental biology; **Adjunct Professors** *J. Tal Huber,* dairy nutrition; *Lynn F. James,* animal physiology; *Michael R. Marshall,* veterinary science; *Kanok Pavasuthipaisit,* medical science, anatomy; *R. Dean Plowman,* dairy genetics, management; *Rex S. Spendlove,* microbiology; **Adjunct Research Professor** *Jeffrey S. Stevenson,* dairy and animal physiology; **Professors Emeriti** *Clive W. Arave,* behavior, dairy genetics; *John E. Butcher,* ruminant nutrition; *Jay W. Call,* veterinary medicine; *C. Elmer Clark,* poultry physiology; *Warren C. Foote,* reproductive physiology; *Doyle J. Matthews,* animal breeding, meats; *James LeGrande Shupe,* veterinary science, comparative clinical medicine; *Norris J. Stenquist,* livestock production, nutrition; *Wallace R. Taylor,* dairy breeding, dairy herd improvement; *Don W. Thomas,* veterinary medicine; **Associate Professors** *Haven B. Hendricks,* swine production; *Kenneth C. Olson,* range livestock nutrition, management; *Randall D. Wiedmeier,* beef cattle nutrition, management; **Adjunct Associate Professors** *Dale R. Gardner,* chemistry/toxicology; *John D. Olsen,* veterinary physiology; *Kip E. Panter,* animal science/toxicology; **Associate Professors Emeriti** *Charles H. Mickelsen,* dairy management, dairy nutrition; *Larry M. Slade,* equine nutrition, management; **Research Associate Professors** *Dale L. Barnard,* virology; *M. Keven Jackson,* veterinary pathology, pathogenesis of viral diseases; *Ronald L. Boman,* dairy nutrition, management; *John D. Morrey,* virology, transgenic animals; *Donald F. Smee,* viral chemotherapy; *Shiquan Wang,* reproductive physiology, molecular biology; *Shiguang Yang,* immunoparasitology; **Adjunct Research Associate Professor** *John T. Stellflug,* reproductive physiology, biochemistry, statistics; **Research Associate Professor Emeritus** *Melvin J. Anderson,* dairy nutrition; **Assistant Professors** *Tiffany R. Julen Day,* equine production, management; *Tilak R. Dhiman,* dairy nutrition; *Jeffery O. Hall,* veterinary pathology, toxicology; *G. Reed Holyoak,* animal diseases, clinical veterinarian; *David B. Vagnoni,* dairy nutrition; *Allen J. Young,* dairy management, reproduction; *Dale R. ZoBell,* beef production, management; **Adjunct Assistant Professors** *Frank L. Barnes,* reproductive physiology; *Philippe Collas,* biology, reproductive physiology; *Thomas J. DeLiberto,* veterinary medicine of wild species; *David D. Frame,* poultry diseases; *Paul C. Genho,* beef cattle management; *A. Kent Hauck,* fisheries, microbiology; *John T. Lohr,* microbiology; *Robert J. Miller,* veterinary science; *Roy W. Silcox,* physiology, nutrition; *Gary D. Snowder,* animal genetics; *Bryan L. Stegelmeier,* pathology; *J. Christopher Wilson,* veterinary medicine, fisheries; **Research Assistant Professors** *Robert E. Buckner,* turkey nutrition; *John H. Huffman,* virology; *Karen E. Vagnoni,* reproductive immunology, reproductive physiology; *Milan Shipka,* dairy science, director, George B. Caine Teaching and Research Center; **Adjunct Research Assistant Professor** *Timothy A. McAllister,* ruminant nutrition/microbiology; **Research Assistant Professor Emeritus** *Robert E. Warnick,* turkey nutrition; **Instructors** *Parl Galloway,* animal science, manager, Animal Science Farm; *Jonathan W. Merriam,* Dairy Herdsman Program Coordinator

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Animal Science, Dairy Science, Bioveterinary Science; Master of Science (MS) and Master of Arts (MA) in Animal Science, Bioveterinary Science, Dairy Science; Doctor of Philosophy (PhD) in Animal Science; MS and PhD degrees in Toxicology and Molecular Biology are available through the Interdepartmental Toxicology and Molecular Biology programs

Certificate Program: Dairy Herdsman

Undergraduate Programs

Objectives

Bachelor's degree students majoring in animal or dairy sciences may choose a program from three career core areas: (1) Science, (2) Animal (Dairy) Industry, and (3) Animal (Dairy) Management. The curricula in the animal and dairy sciences are designed to prepare students for a broad base of rewarding careers in the dynamic disciplines of animal agriculture. Teaching and research facilities, flocks, and herds are available for "hands-on" practical laboratory experiences, along with faculty-mentored research projects. An assigned faculty adviser helps students develop, arrange, and expedite their personal undergraduate program.

Preveterinary bachelor's degree programs are intended to prepare students for admission to professional veterinary medical schools and/or graduate study in the biomedical sciences. A preveterinary bachelor's degree is considered a nonterminal degree. Preveterinary students may earn a bachelor's degree in bioveterinary science, or in the science core of animal science or dairy science with a preveterinary option.

Instruction in the ADVS Department also encompasses a diversified co-curricular program including allied clubs, intercollegiate livestock judging and rodeo teams, and involvement with their respective professional societies.

Animal and Dairy Sciences

Science Core. Designed for students desiring education beyond the bachelor's degree, this core is a preparatory course of study for students who have a career interest in the following areas: animal research in genetics; reproductive biology, nutrition (public or private sector); biotechnology; teaching; and advanced degrees (MS, PhD, and veterinary school). The science core requires an especially close student-adviser relationship, as post-graduate training is considered essential for professional success in these disciplines.

Animal (Dairy) Industry Core. This core offers the greatest number of career opportunities for students with a bachelor's degree in the present field of animal agriculture. Animal industry

has the largest sector of employment opportunities both domestically and internationally. In addition to on-campus courses, students in this core will be expected to fulfill an internship in industry experience. Students selecting this core prepare for the following careers: corporate agribusiness, wholesale and retail marketing and sales, economics, accounting, agricultural real estate and appraisal, financing and credit operations, public policy, agricultural media or communications, insurance and/or commodity speculation, commodity groups, value-added animal product processors, agricultural cooperatives, and others within the scope of the animal and dairy industries.

Animal (Dairy) Management Core. Animal management reflects the more traditional livestock production management emphasis, yet encompasses a program integrating the principles of ecosystem or holistic management, along with the important desire for the sustainability of the systems utilized. A dependable food supply worldwide is crucial to world economic and population stability. This core is designed to train students in the basic and applied animal sciences, coupled with the relatively new disciplines associated with environmentally-friendly livestock production systems. Students can select either an advanced research project or an internship experience in industry during their junior or senior year. Graduates in this core area gain a basic background suitable for a career in the areas of ranch or farm management, state and federal government agricultural agencies, agroecology, sustainable agriculture, or cooperative extension work domestically and internationally.

Preveterinary Program

Preveterinary students take courses required by veterinary schools. Classes should be planned to assure meeting the current requirements for the veterinary schools to which the student plans to apply for admission. In most cases, preveterinary preparation requires a major portion of three academic years. Students accepted into veterinary school prior to completion of their BS degree may transfer credits back to USU for completion of their BS degree in bioveterinary science.

Utah participates in WICHE (Western Interstate Commission for Higher Education) which provides state subsidization of Utah resident (5 years or longer at the time of application) students entering any veterinary school that is a WICHE-participating school. At present this includes Colorado State University, Washington State University, Oregon State University, and University of California at Davis. Students may also apply to other veterinary schools as out-of-state applicants.

Vocational Subbaccalaureate Program

Dairy Herdsman Certificate. Students completing the required courses and experience in the Dairy Herdsman's curriculum usually find employment with a commercial or family dairy. Some enter dairy-related businesses. Students desiring to continue their dairy education may complete a BS degree in three additional years with proper planning and suitable academic performance.

Requirements

Departmental Admission Requirements. Undergraduate admission requirements for the animal science and dairy science programs are the same as those described for the University. Students in good standing may apply for admission to the department. New freshmen admitted to USU in good standing qualify for admission to the bioveterinary science major. Students with less than 60 semester credits transferring from other institutions need a 2.2 transfer GPA, and students with less than 60 semester credits transferring from other USU majors need a 2.0 GPA for admission to the bioveterinary science major. All students with 60 or more semester credits need a 2.75 total GPA to be admitted to advanced standing in bioveterinary science.

Departmental Standards. The following minimum requirements apply to all students working toward any bachelor's degree offered by the ADVS department. Bachelor's degree candidates must comply with these requirements in order to graduate: (1) courses required for the major may be repeated only once to improve a grade, and (2) courses required for the major may not be taken for pass-fail credit. In addition to these requirements, animal science and dairy science bachelor's degree candidates must attain a grade point average of 2.25 in the ADVS courses specified as requirements in their respective core curricula to graduate. Bioveterinary science degree candidates must attain an overall GPA of 3.0 to graduate.

Graduation Requirements

Courses required and recommended for meeting BS degree graduation requirements in the various options available in the department are as follows:

Animal/Dairy Science: Science Core

The following courses are required for students pursuing a bachelor's degree in the animal science or dairy science Science Core: ADVS 1110, 1200, two 2000-level species production practices courses (A), 2130 (D), 3000, 3020, 3500, 3510, 4200, 4250 or 4800, 4560, 4910, 4920, two 5000-level species management courses (A), 5130 (D); ASTE 3090 (D); Biol 1210, 1220, 2200, 3300; Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 3700; Math 1050, 1060; Stat 3000.

Animal/Dairy Science: Industry Core

The following courses are required for students pursuing a bachelor's degree in the animal science or dairy science Animal (Dairy) Industry Core: ADVS 1110, 1200, 1250, three 2000-level species production practices courses (A), 2130 (D), 3000, 3300, 3500, 3510, 3650 (A), 4200, 4250, 4560, 4910, 4920, two 5000-level species management courses (A), 5030, 5130 (D); ASTE 3090; Biol 1010; Chem 1110, 1120; Econ 1500; Math 1050; NFS 5020 (A), 5030 (D); Soil 2000; Stat 1040. In addition, students in the animal or dairy science Industry Core must choose four courses from the following: Acct 2010; Econ 2010, 2040, 4010, 4030, 5030; MHR 2990, 3110.

Animal/Dairy Science: Management Core

The following courses are required for students pursuing a bachelor's degree in the animal science or dairy science Animal (Dairy) Management Core: ADVS 1010 (D)*, 1110, 1200, 1250*, three 2000-level species production practices courses (A), 2130 (D)*, 3000, 3300, 3500, 3510, 3650 (A), 4200, 4250* or 4800*, 4560, 4910, 4920, two 5000-level species management courses (A), 5030, 5130 (D), 5520 (A); ASTE 3090; Biol 1010; Chem 1110, 1120; Econ 1500; Math 1050; NFS 5020 (A), 5030 (D); Soil 2000; PlSc 4320, RLR 2200, 4000 (A); Stat 1040.

Bioveterinary Science

This curriculum includes those courses required for application

to WICHE veterinary schools after three years of study. Requirements are as follows:

Freshman year: ADVS 1110, 1200; Chem 1210, 1220, 1230, 1240; Engl 1010; Math 1050; two University Studies Breadth courses.

Sophomore year: ADVS 2920; Biol 1210, 1220, 1230, 1240; Chem 2310, 2320, 2330; Math 1060; Stat 1040; two University Studies Breadth courses; electives.

Junior year: ADVS 3000; Biol 2200; Chem 3700, Engl 2010; Phyx 2110, 2120; one University Studies Breadth course; two University Studies Depth courses; electives.

Senior year: Choose from among the following courses to complete the University requirements for the bachelor's degree: ADVS 3020, 3510, 4200, 5160, 5240, 5260, 5490, 5700, 5710, 5750; Biol 3300, 4200; Math 1210, 1220.

BA Degree in Animal/Dairy/Bioveterinary Science

Students must complete requirements for the BS degree in these respective programs (see above), plus two years of a foreign language (see page 48 of this catalog).

Honors

There is also an Honors Plan for students desiring a BA or BS degree "with Honors" in Animal/Dairy/Bioveterinary Science. For details, students should contact their academic adviser.

ADVS Minors

A minor can be valuable when associated with a major in agricultural education, agricultural economics, plant science, nutrition and food science, business, economics, computer science, range science, and in other disciplines where the animal industry has direct or indirect involvement.

Requirements for specialty or emphasis area minors are listed below. The same departmental standards applying to animal science and dairy science majors also apply to all minors (see page 100).

Requirements for Minors

The following is a listing of courses for the various minor emphasis areas. A specific course may **not** be used to fulfill the requirements of more than one ADVS minor.

General Animal Science: ADVS 1110, 2450; choose one or more courses from ADVS 2080, 2090, 2120, 2190; 6 elective ADVS credits with approval of an animal science adviser.

General Dairy Science: ADVS 1110, 2130, 2450; 6 elective ADVS credits with approval of a dairy science adviser.

Bioveterinary Science: ADVS 1200, 3000, 4200; 3 elective ADVS credits with approval of a bioveterinary science adviser.

Horse Production: ADVS 1110, 2190, 2250, 2450; 2 or more elective ADVS credits with approval of an animal science adviser.

Horse Training: ADVS 1110, 1600, 2190, 2600; 2 or more elective ADVS credits with approval of an animal science adviser.

Dairy Herdsman: ADVS 1020, 1030, 1040, 1050, 1060. *(Not available to Dairy Science Majors.)*

Transfer students must have a minimum of one 3-credit upper-division course in residency with the approval of an ADVS adviser.

Additional Information and Updates

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheets. For more information on ADVS Department minors, see minor requirement sheet. These are available from the ADVS Department main office (AG S 230).

Successful completion of a bachelor's degree program in the ADVS Department requires that a very close student-academic adviser relationship be established and continued through each student's bachelor's degree program. Each student must take the responsibility of establishing this close working relationship with his or her adviser. Doing this soon after the student's entry into the department can keep academic problems to a minimum.

For updated information on ADVS programs and course offerings, check the departmental web page at http://www.usu.edu/~advs/.

Safety and Liability in Classes and Laboratories

Certain classes and laboratories involve a risk of bodily injury or of damage to clothing. Students should take appropriate precautions and wear suitable protective clothing. Some of the risks include handling or being near animals, slick floors or corrals, use of toxic or corrosive substances, and the use of sharp or breakable instruments and equipment. Students should take precautions to avoid fainting during demonstrations or work with animal tissues or operative procedures. Students must assume their own liability protection for travel to and from classes, laboratories, and field trips. The University and its employees assume no liability in the performance of classroom or laboratory instruction or on scheduled field trips, or for other dangerous activities. The student, by voluntarily participating in these classes and activities, agrees to assume the risk and not hold USU or its staff liable.

Financial Support

In addition to the scholarships and other financial aid available through the University, the department awards designated scholarships to qualified students (for details, refer to Scholarships and Awards in the College of Agriculture in the Financial Aid section of this catalog, pages 24-27). The department employs students on a part-time basis to assist with its research and operate its animal facilities. The department also coordinates cooperative education and internship employment opportunities for students.

(A) Required of Animal Science majors.

(D) Required of Dairy Science majors.

*Not required for students who have completed the Dairy Herdsman Certificate Program (Dairy Management Core only).

Graduate Programs

Admission Requirements

In addition to the general admission requirements (see pages 60-61), applicants should have satisfactory (3.0 GPA or better) grades in completion of previous degree programs. GRE exam, verbal, quantitative, and analytical scores at or above the 40th percentile are required.

The applicant for a graduate program in animal or dairy science should have completed a BS undergraduate program similar to the USU animal science or dairy science Science Core BS degree. This background would include the following courses and their prerequisites: Biol 1210 and 1220 or their equivalents; Chem 2310 and 2320 or their equivalents; Math 1050 and Stat 1040 or their equivalents. Applicants with deficiencies in these areas may be admitted to the graduate program subject to the completion of remedial coursework specified by the department. Other preparatory courses may be specified by the student's supervisory committee.

Applicants to the bioveterinary science graduate program should have a degree in bioveterinary science, biology, microbiology, chemistry, or one of the animal sciences. Preveterinary students oriented towards graduate research studies are strongly encouraged to apply.

Degree Programs

Master of Science. The MS is available to qualified students with bachelor's degrees. MS degrees are offered by the department in animal science and dairy science, with five specializations in each, and in bioveterinary science.

Master of Arts. The MA is available in the same majors and specializations as the MS for students who meet the School of Graduate Studies requirements for the degree (see page 65).

Doctor of Philosophy. The PhD degree in animal science is offered with four specializations. It is available to qualified students with master's degrees in related disciplines. The PhD is a terminal research degree that is awarded upon successful completion of a comprehensive program of coursework and original research in the area of one of four specializations.

Specializations

Animal Nutrition. This specialization involves studies in biochemistry, principles of nutrition, animal management, nutritional physiology, and animal feedstuffs. Cooperation with producers, feed industry groups, other departments of the University, and USDA collaborators, along with research funding from private industry, strengthens the graduate program in this area.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6010, 6800, any four ADVS graduate nutrition courses at the discretion of the supervisory committee; one 5000-level Statistics course. Students in the MS program are required to complete or to have completed Chem 3700 or its equivalent, but will not receive graduate credit for it. Students in the PhD program are required to meet or have met all MS program requirements, as well as to complete the following coursework: ADVS 6800 (additional to the MS requirement), ADVS graduate nutrition courses as directed by the supervisory committee; Chem 5700, 5710; one 5000-level Statistics course (additional to the MS requirement); additional coursework at the discretion of the supervisory committee to a total of at least 30 credits.

Breeding and Genetics. This specialization involves studies in cytogenetics, molecular genetics, quantitative genetics, statistics, and animal management. Cooperation with the Biotechnology Center, USDA, other departments of the University, collaborators at other research institutions, livestock producers, and commercial biotechnology companies broadens the resources of this graduate program.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6010, 6300, 6800, 6820; Biol 5190; Stat 5200. Students in the PhD program are required to complete the following coursework in addition to that required for the MS degree: ADVS 6800; Chem 5700, 5710; Stat 5110.

Students in this specialization may choose elective coursework with the approval of their supervisory committees from the following courses: ADVS 5160, 5260, 6080, 6090, 6120, 6130, 6190, 6200; Biol 5050, 5170, 5250, 6180, 6210; PlSc 5300.

Molecular Biology. This interdepartmental specialization involves studies in molecular genetics, biochemistry of nucleic acids, advanced cell biology, quantitative genetics, and reproductive physiology. This is part of the Interdepartmental Program in Molecular Biology. Students who choose this specialization must meet both the ADVS and the Molecular Biology requirements. Cooperation with other departments, particularly the Department of Biology and the Department of Chemistry and Biochemistry; with the Biotechnology Center and other research centers of the University; and with USDA collaborators allows for a strong graduate program in this area.

Course requirements: Students are required to complete the Molecular Biology Program Core curriculum (see pages 299-300). In addition, students in the MS program must complete the following ADVS requirements: ADVS 6010, 6800; Stat 5200; and a minimum of 3 credits from the following courses: ADVS 6200, 6300, 6510, or 5820/6820. Students in the PhD program must complete the following ADVS requirements: ADVS 6800, 7540 or 7560; and a minimum of 3 credits from the following ADVS courses: ADVS 6200, 6300, 6510, 6820, or Biol 5150.

Reproductive Biology. This specialization involves studies in physiology and endocrinology of reproduction; embryo technology, including collection, culture, manipulation, storage, and transfer of embryos; disease transmission, cytogenetics and molecular genetics; and environmental and toxicological influences on reproductive processes and fetal development. Cooperation with other departments and research centers of the University and with USDA collaborators allows for a strong graduate program in this area.

Course requirements: Students in the MS program are required

to complete the following courses: ADVS 6010, 6200, 6800; Biol 4200; Stat 5200. Students in the PhD program are required to complete the following coursework additional to the MS requirements: ADVS 6800; Biol 5150, 6210; Chem 5700, 5710. Additional coursework for the MS and PhD degree may be required at the discretion of the supervisory committee.

Animal or Dairy Management (MS only). This specialization involves studies in the applications of the principles of genetics, reproductive biology, and nutrition to animal or dairy management at an advanced level. Appropriate emphasis is also placed on statistics, economics and business administration, and range management. The management specialization offers the option of degree programs with or without thesis (Plan A or Plan B). Graduates in management from a program including thesis (Plan A) may pursue advanced studies in more specialized fields. The MS in management without a thesis (Plan B) is considered a terminal degree.

Course requirements: Students choosing either the option with thesis (Plan A) or the option without thesis (Plan B) are required to complete the following courses: ADVS 6010, 6200, 6300, 6520 or 6530, 6800; plus one of the following (if comparable course not previously completed at the undergraduate level): ADVS 6080, 6090, 6120, 6130, 6190; one 5000-level Statistics course. Additional courses in related areas will be required as directed by the supervisory committee.

Bioveterinary Science (MS or MA Only)

This degree program involves studies in biochemistry, statistics, pathology, toxicology, virology, parasitology, pharmacology, microbiology, and laboratory animal management. Advanced techniques in laboratory procedure and animal health research are emphasized. Cooperation with other departments and research centers of the University and with federal collaborators and agencies allows for a strong graduate program in bioveterinary science.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6010, 6700, 6800; Stat 5200. Additional coursework will be required by the supervisory committee from among the following courses: ADVS 5260, 5750, 6200, 6350, 6490, 6500, 6600, 6710, 6820; Biol 5050, 5150, 5330, 5340; Chem 5700, 5710.

Research

The ADVS department conducts a broad range of basic and applied research in the areas of animal reproduction, animal nutrition, livestock and dairy management, animal health, virology, parasitology, toxicology, animal behavior, cytogenetics, and molecular genetics. Department facilities include over 30 research laboratories on campus and at local and regional animal research facilities. There are research herds and flocks of beef and dairy cattle, sheep, and swine housed close to the University. There are additional research units housing beef cattle, sheep, and turkeys located throughout the state. Research in the department is funded by a multimillion dollar budget derived from support by the Utah Agricultural Experiment Station and by substantial outside contracts and grants. Cooperation with other departments and research centers of the University and with federal collaborators enhances the ADVS research and graduate programs. Significant in this regard are the University Biotechnology Center, the Utah State Animal Disease Diagnostic Laboratories, the Laboratory Animal Research Center, the Center for Environmental Toxicology, the Center for the Genetic Improvement of Livestock, and the on-campus USDA Poisonous Plant Laboratory.

Financial Assistance

Both departmental and research grant support are available to matriculated graduate students on a competitive basis. The department funds a number of graduate assistantships, which are available on a competitive basis to matriculated graduate students who are U.S. citizens, nationals, or residents. Students interested in departmental assistantships may request an application form from the department. Applications for assistantships for the following academic year must be submitted by April 1.

Acceptance to graduate study in the ADVS Department does not constitute a guarantee of financial assistance.

Career Opportunities

Career opportunities are available for students who have earned graduate degrees in the MS and PhD programs offered by the ADVS Department as described below.

Animal and Dairy Science Graduate Degree Programs

Animal Nutrition. Career opportunities exist in extension, university and private research, the commercial animal feedstuffs industry, private consulting firms, and international programs.

Breeding and Genetics. Career opportunities exist in extension university and private research, commercial animal breeding and genetic engineering enterprises, and international programs.

Molecular Biology. Career opportunities exist in university, federal, and private research organizations, and in commercial applications in the rapidly growing area of biotechnology.

Reproductive Biology. Career opportunities exist in extension; university and private research; the pharmaceutical, embryo transfer, and artificial insemination industries; private consultation; and international programs.

Animal or Dairy Management. Career opportunities include extension, private consultation firms, farm and ranch management, sales and service to agricultural producers, agricultural finance, and international programs.

Bioveterinary Science MS or MA Degree Program

Career opportunities in this area exist in research, management, and submanagement positions in public and private health research and testing organizations, and in commercial industries in the health field. Graduates from this program may seek admission to advanced degree programs in the biological sciences or veterinary medicine.

Animal, Dairy and Veterinary Sciences Courses (ADVS)

1010. Artificial Insemination and Reproduction. Principles of reproduction, artificial insemination, and handling of semen. Anatomy and physiology of the bovine reproductive tract and reproductive management of the dairy farm. (2F)

1020. Dairy Cattle Nutrition and Feeding. Applied approach to nutrients, feeds, digestion, and nutrient utilization by dairy cattle. Dietary requirements and feeding practices. (3F)

1030. Lactation and Milking Systems. The mammary gland, udder health, and mastitis and its control. Milk quality and marketing. Principles involved in the function, design, and maintenance of dairy equipment. (3Sp)

1040. Records and Financial Aspects of Dairy Herd Operations. Record keeping systems, tax records, estate planning, DHI records, and computer record systems. Principles of credit and finance. Accessing loan sources. (3Sp)

1050. Dairy Genetics. Principles of dairy genetics, mating, pedigrees, and breeding. Purebred cattle type traits and classification. (3F)

1060. Applied Feeding and Management of Dairy Calves and Basic Construction of Facilities. Practical experience in feeding and management of dairy calves from birth to weaning. Students participate in actual calf-raising programs. Development of basic skills required for planning and building agricultural structures. (3Sp)

1100. Small Scale Animal Production. Fundamentals of raising domestic farm animals in a semi-rural, noncommercial setting. Considerations of feeding, breeding, housing, marketing, sanitation, general health care, and community zoning factors. For nonmajors. (3F)

1110. Introduction to Animal Science. Influence and contributions of animal production and its commodities to society. Introductory scientific principles of animal science, livestock production systems, and contemporary issues. Introduction to professions and careers in animal agriculture and veterinary sciences. (4F,Sp)

1200. Anatomy and Physiology of Animals. Normal structure and function studied systematically. Comparative livestock, poultry, pleasure and companion animals, laboratory animals, and humans. (4Sp)

QI 1250. Applied Agricultural Computations. Development of understanding and proficiency in the application of basic mathematical skills, including algebra and geometry, to practical computational situations encountered in the agricultural sciences. (2F,Sp)

1600. Western Horsemanship I. Grooming, saddling, bridling, mounting, seats and hands, horseback riding both bareback and on western saddle. For students with limited or no previous riding experience. Western-type riding boots and health insurance required. (2F,Sp)

1720. Dairy Cattle Evaluation and Judging. Evaluation of cattle based on exterior anatomical traits functional for improving longevity and milk production. Explanation of classification systems used by breed associations and the artificial insemination industry. Development of basic skills for preparing dairy cattle for show. (1Sp)

2080. Beef Production Practices. Production practices in the handling, selection, and care of beef cattle. Demonstrations of equipment, facilities, and skills relevant to beef cattle production. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (2Sp)

2090. Sheep Production Practices. Production practices in the handling, selection, and care of sheep. Demonstrations of equipment, facilities, and skills relevant to sheep and wool production. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (2Sp)

2120. Swine Production Practices. Production practices in the selection, handling, and care of swine. Demonstrations of equipment, facilities, and skills relevant to swine industry. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (2Sp)

2130. Dairy Production Practices. Basic husbandry skills needed to carry out day-to-day operations on a dairy farm. Principles of dairy herd health, disease prevention, and treatment. Prerequisite: ADVS 1020 or 1110 (may be taken concurrently) or permission of instructor. (3F)

2190. Horse Production Practices. Production practices in the selection, care, and evaluation of horses. Survey of breeds of horses, their characteristics, and their uses, as well as equine behavior, health care, nutrition, reproduction, anatomy, and physiology. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (2F)

2250. Cooperative Work Experience. For students who require animal industry experience to prepare them for advanced curriculum in Animal, Dairy, or Bioveterinary Science. (1-12F,Sp,Su) ®

2450. Animal Feeds and Feeding Practices. Feed composition and characteristics influencing animal performance. Digestion of feeds and nutrient utilization by animals. Ration formulation and feeding strategies. For nonmajors (4Sp)

2600. Western Horsemanship II. Alternative training techniques for western pleasure and western reining horses, teaching leads, cueing techniques, reining maneuvers, and show-style riding. Western-type riding boots and health insurance required. Prerequisite: ADVS 1600. (2F,Sp)

2920. Orientation to Veterinary Medicine. Preparation of preveterinary students for successful application and admission to professional veterinary schools. Taught first half of spring semester. (0.5Sp)

3000. Animal Health and Hygiene. Introduction to basic principles of disease. Agents, mechanisms, and preventive measures for common diseases of farm animals will be emphasized. Prerequisite: ADVS 1200. (3Sp)

3020. Biotechnology in Agriculture. Broad view of biotechnology in agriculture. Contributions of advances in recombinant DNA technology, molecular genetics, and genetic engineering toward animal breeding and development of new medicines. Prerequisites: Biol 1220, Chem 2310. (2F)

3200. Ethical Issues in Genetic Engineering and Biotechnology. Critical evaluation of ethical issues of genetic engineering in biotechnology, including biological engineering and cloning of plants, animals, and humans. Presents basic science of genetic engineering and biotechnology. (3Sp)

CI 3300. Animal Production and Public Policy. Students identify problems, become involved, organize resources, read and analyze documents, see different sides of an issue, and arrive at workable solutions for dealing with contemporary forces in society impinging on the ability of farmers and ranchers to function. (2F)

3500. Principles of Animal Nutrition. Biochemical characterization and chemical analysis of feedstuffs for farm animals, with regard to carbohydrates, proteins, lipids, minerals, and vitamins. Catabolic/anabolic pathways associated with utilization of these nutrients with respect to production, general health, and nutritional disorders. Prerequisites: ADVS 1200; Chem 1120 or 2320. (3F)

QI 3510. Applied Animal Nutrition. Categorization of farm animal feeds into energy feeds, protein feeds, dry forages, silages and haylages, pasture and range plants, and vitamin-mineral supplements. Emphasis placed on practical diet formulation, including computerization and aspects of feed delivery and nutritional management. Prerequisite: ADVS 3500 or Chem 3700. (3Sp)

3600. Western Horsemanship III. Utilization of current training methods relating to basic equine behavior, ground breaking skills, and riding and training of the unbroken and freshly broken horse. Prerequisite: ADVS 2600. (2Sp)

3650. Live Animal and Carcass Evaluation. Judging, grading, and pricing of market animals and carcasses, with emphasis on comparative evaluation of live animals and carcasses. (3F)

3710. Advanced Livestock Judging. Advanced methods of selection and identification of superior animals for breeding stock. Emphasis on performance records, judging, grading, and oral reasons. (2F,Sp)

3900. Special Problems and Readings. Students conduct short-term studies and/or literature review with critical analysis of individualized subject matter. Formal written reports required. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

3910. Special Topics. Topics of special interest to those who have needs not satisfied by courses currently offered. (1-5F,Sp,Su) ®

3920. Internship in Veterinary Medicine. A directed and evaluated work experience with a veterinarian. For each credit, student must document at least 54 hours of work time. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

CI 4200. Physiology of Reproduction and Lactation. Introduction to principles of physiology as they relate to the reproductive and lactation processes in domestic mammals. Factors affecting reproductive and lactation performance and their applications in animal management. Prerequisites: ADVS 1200; Chem 1120 or 2310. (4Sp)

4250. Internship in Animal Industry. Directed and evaluated educational work experience with an animal production unit, related business, or government facility in cooperation with the Livestock Education Foundation. Prerequisite: Permission of instructor. (1-12F,Sp,Su) ®

QI 4560. Principles of Animal Breeding. Genetic influences affecting animal performance and the application of selection principles, breeding systems, and methods of improvement to farm animals, including beef and dairy cattle, sheep, swine, and horses. Prerequisite: Biol 1010 or 1220. (3F)

4800. Undergraduate Research or Creative Opportunity. Research or creative activity pertaining to animals. May include management, production, medical, or basic science, with consideration of biological, chemical, or physical aspects, or instrument design. Prerequisite: Permission of instructor. (1-6F,Sp) ®

4910. Preprofessional Orientation. Survey of the professional opportunities in the animal industries, with emphasis on contacts with industry leaders. Preparation for careers and employment. Prerequisite: Upper-division standing. (1F)

CI 4920. Undergraduate Seminar. Current developments in agricultural field selected by student. Each student is responsible for the research and oral presentation of a topic in the animal industries. Group investigations, preparations, and deliberations on issues in animal agriculture. Prerequisite: Senior standing. (2F)

5030. Sustainable Agricultural Production Systems with Animals. Study of various domestic animal production systems in relation to sustainable agriculture and integrated ranch and farm management strategies. Consideration of environmental factors and overall profitablity. Prerequisite: ADVS 1110. (3Sp)

5080 (d6080).[1] Beef Cattle Management. Managing the beef enterprise to yield optimum returns through integrating resource use and applying breeding, nutrition, reproduction, and animal health practices. Prerequisites: ADVS 2080; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

5090 (d6090). Sheep Management and Wool Technology. Detailed study of the managerial considerations for range and farm flock operations. Examinations of wool, and review of wool clip handling and merchandising. Prerequisites: ADVS 2090; ADVS 3510, 4200, 4560 (may be taken concurrently). (4Sp)

5120 (d6120). Swine Management. Management decisions based on nutrition, breeding programs, herd health practices, herd records, and marketing opportunities. Prerequisites: ADVS 2120; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

***5130 (d6130). Dairy Cattle Management.** Capstone course drawing together concepts and applying them to a total dairy farm management program. Prerequisites: ADVS 2130; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

5160. Methods in Biotechnology: Cell Culture. Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. (3Sp)

5190 (d6190). Horse Management. Management decisions in horse enterprises emphasizing business procedures, including merchandising, records, selection, uses, housing, facilities, nutrition, feeding, health care, and breeding. Emphasizes total management of horse enterprise, rather than husbandry. Prerequsites: ADVS 2190; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

5240. Methods in Biotechnology: Protein Purification Techniques. Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: Chem 3700. (3Sp)

5260. Methods in Biotechnology: Molecular Cloning. Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: Chem 3700 or Biol 2200; or permission of instructor. (3)

5350 (d6350). Introductory Pharmacology and Pharmacokinetics. Basic principles of pharmacology and pharmacokinetics providing basis for extrapolation of biological kinetics of foreign compounds to a wide variety of xenobiotics encountered in toxicology, biology, and research. Prerequisites: Biol 4510, Chem 3700. (3Sp)

5400 (d6400). Environmental Toxicology. Presents in-depth survey of toxic chemicals present in the environment, environmental factors impacting fate of chemicals, potential biological effects associated with chemical exposures, and methods of reducing associated risks. Prerequisite: Chem 3700. (3Sp)

5490 (d6490). Research Animal Techniques. Proper methods of animal research. Required to utilize in research those species of animals covered under PHS policy and by the Animal Welfare Act at Utah State University. (0.5F, Sp) ®

****5520 (d6520). Grazing Livestock Nutrition and Management.** Principles of livestock nutrition and production applied to the grazing environment and the relationships of livestock and range management for optimizing values from both. Prerequisites: ADVS 3510; RLR 4000 (recommended). (2Sp)

***5530 (d6530). Nutritional Management of Farm Animals.** Nutritional management, problem solving, and feeding strategies as they influence performance of farm animals. Optimization of nutrition for various species and classes of domestic livestock. Prerequisite: ADVS 3510. (3Sp)

***5590 (d6590). Wool Science.** Biology of wool fiber growth, including histology, fiber arrangement, morphology, and fleece genetics. Environmental and physiological factors affecting wool growth. Prerequisite: Biol 1010 or 1220. (3Sp)

CI 5700 (d6700). Animal Histology and General Pathobiology. Microscopic anatomy of normal domestic animals' cells, tissues, and organs. Introduction to principles of structural and functional changes associated with diseases. Prerequisite: ADVS 1200. (5F)

5710 (d6710). Special Pathobiology. Correlation of abnormalities with causes, by studying disease processes by systems, organs, and cells. Prerequisite: ADVS 5700/6700. (3Sp)

5750. Parasitology. Introduction to biology of parasitism. Discussion of representative examples of human and animal parasites. Emphasizes classification, life cycles, and clinical significance of medically important parasites. Laboratories concentrate on taxonomy and morphology of parasites. Prerequisite: Biol 1220. (4F)

****5820 (d6820). Animal Cytogenetics and Gene Mapping.** Structure and properties of chromosomes, chromosome behavior during cell division, chromosomal influence on phenotype, and factors causing changes in chromosome structure and number. Gene markers and gene mapping, with emphasis on applications for livestock. Prerequisite: ADVS 4560 or Biol 2200. (3F)

****5860. Poisonous Range Plants Affecting Livestock.** Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. (2Sp)

6010. Animal Research Orientation. Orientation to graduate study and to research procedures and methods in the animal sciences, with introduction to the design and analysis of experiments, research ethics, and accessing research databases. For beginning graduate students. (1F)

6080 (d5080). Beef Cattle Management. Managing the beef enterprise to yield optimum returns through integrating resource use and applying breeding, nutrition, reproduction, and animal health practices. Prerequisites: ADVS 2080; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

6090 (d5090). Sheep Management and Wool Technology. Detailed study of the managerial considerations for range and farm flock operations. Examinations of wool, and review of wool clip handling and merchandising. Prerequisites: ADVS 2090; ADVS 3510, 4200, 4560 (may be taken concurrently). (4Sp)

6120 (d5120). Swine Management. Management decisions based on nutrition, breeding programs, herd health practices, herd records, and marketing opportunities. Prerequisites: ADVS 2120; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

***6130 (d5130). Dairy Cattle Management.** Capstone course drawing together concepts and applying them to a total dairy farm management program. Prerequisites: ADVS 2130; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

6190 (d5190). Horse Management. Management decisions in horse enterprises emphasizing business procedures, including merchandising, records, selection, uses, housing, facilities, nutrition, feeding, health care, and breeding. Emphasizes total management of horse enterprise, rather than husbandry. Prerequsites: ADVS 2190; ADVS 3510, 4200, 4560 (may be taken concurrently). (3Sp)

****6200. Physiology of Reproduction.** Study of processes of reproduction in mammals, including fertilization, embryonic development, reproductive endocrinology, and mechanisms of control. Prerequisites: ADVS 4200, Chem 3700. (3Sp)

****6250 (d7250). Theriogenology.** Applied reproductive physiology, reproductive pathology, and reproductive infectious diseases of cats, dogs, swine, sheep, goats, cattle, horses, and new world camelids. Prerequisite: ADVS 6200. (5F)

***6300. Animal Breeding Theory.** Basic theoretics of populations as applied to breeding and improvement of domestic animals with emphasis on effects of directed selection and mating and design of effective breeding plans. Prerequisite: ADVS 4560. (3F)

6350 (d5350). Introductory Pharmacology and Pharmacokinetics. Basic principles of pharmacology and pharmacokinetics providing basis for extrapolation of biological kinetics of foreign compounds to a wide variety of xenobiotics encountered in toxicology, biology, and research. Prerequisites: Biol 4510, Chem 3700. (3Sp)

6400 (d5400). Environmental Toxicology. Presents in-depth survey of toxic chemicals present in the environment, environmental factors impacting fate of chemicals, potential biological effects associated with chemical exposures, and methods of reducing associated risks. Prerequisite: Chem 3700. (3Sp)

6490 (d5490). Research Animal Techniques. Proper methods of animal research. Required to utilize in research those species of animals covered under PHS policy and by the Animal Welfare Act at Utah State University. (0.5F, Sp) ®

6500. Animal Nutrition Research Techniques. Laboratory intensive course in routine feedstuff evaluation and research techniques to evaluate nutritional and metabolic responses under in vivo, in situ, and in vitro conditions using feed, digesta, feces, urine, tissue, metabolites, and products. Prerequisite: ADVS 3510. (2F)

***6510 (d7510). Rumen Physiology and Metabolism.** Discussion of some key aspects of physiology and metabolism of the ruminant digestive tract, with emphasis on the rumen. Topics include anatomy and function; motility; metabolism of protein, carbohydrates, and lipids; rumen microbiology; and common digestive disorders. Prerequisite: ADVS 3510. (2F)

****6520 (d5520). Grazing Livestock Nutrition and Management.** Principles of livestock nutrition and production applied to the grazing environment and the relationships of livestock and range management for optimizing values from both. Prerequisites: ADVS 3510; RLR 4000 (recommended). (2Sp)

***6530 (d5530). Nutritional Management of Farm Animals.** Nutritional management, problem solving, and feeding strategies as they influence performance of farm animals. Optimization of nutrition for various species and classes of domestic livestock. Prerequisite: ADVS 3510. (3Sp)

****6540 (d7540). Animal Energetics and Nutrient Metabolism.** Techniques and procedures in measurement of heat production; factors affecting heat production; efficiency of energy utilization in body processes such as work, growth, and synthesis of fats, proteins, and carbohydrates; and the energetic costs of nutrient interconversion and turnover. Prerequisites: ADVS 6510/7510; Chem 5700, 5710. (3F)

****6550 (d7550). Protein Metabolism and Utilization.** Processes involved in the digestion, synthesis, and degradation of protein in the rumen, with special emphasis on protein-energy relationships in the rumen and whole animal. Discussion of protein requirements and efficiency of protein utilization. Prerequisite: ADVS 6510/7510. (3Sp)

***6560 (d7560). Mineral and Vitamin Metabolism.** Principal roles of minerals and vitamins in nutrient metabolism as they apply to animal nutrition. Prerequisite: ADVS 6510/7510. (3F)

***6590 (d5590). Wool Science.** Biology of wool fiber growth, including histology, fiber arrangement, morphology, and fleece genetics. Environmental and physiological factors affecting wool growth. Prerequisite: Biol 1010 or 1220. (3Sp)

****6600. Principles of Toxicology.** Mechanisms of action and effects of toxicants on living organisms. Prerequisite: ADVS 5350/6350. (3F)

6700 (d5700). Animal Histology and General Pathobiology. Microscopic anatomy of normal domestic animals' cells, tissues, and organs. Introduction to principles of structural and functional changes associated with diseases. Prerequisite: ADVS 1200. (5F)

6710 (d5710). Special Pathobiology. Correlation of abnormalities with causes, by studying disease processes by systems, organs, and cells. Prerequisite: ADVS 6700/5700. (3Sp)

6800. Animal, Dairy and Veterinary Science Seminar. Seminars on topics of interest in Animal, Dairy and Veterinary Sciences. (1F,Sp)

6810. Seminar in Toxicology. Graduate seminar in toxicology and related topics. (1Sp) ®

****6820 (d5820). Animal Cytogenetics and Gene Mapping.** Structure and properties of chromosomes, chromosome behavior during cell division, chromosomal influence on phenotype, and factors causing changes in chromosome structure and number. Gene markers and gene mapping, with emphasis on applications for livestock. Prerequisite: ADVS 4560 or Biol 2200. (3F)

6900. Special Problems. Readings, discussions, lectures, literature reviews, and research problems in animal, dairy, and bioveterinary sciences. Prerequisite: Consent of instructor and department. (1-3F,Sp,Su) ®

6910. Readings and Conference in Pharmacology and Toxicology. Independent readings and conferences in the area of pharmacology and toxicology with particular emphasis on current literature. Prerequisite: ADVS 5350/6350. (1-3F) ®

6970. Research and Thesis. (1-12F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

****7250 (d6250). Theriogenology.** Applied reproductive physiology, reproductive pathology, and reproductive infectious diseases of cats, dogs, swine, sheep, goats, cattle, horses, and new world camelids. For 7250 (limited to post-DVM/PhD students), presentation of a publishable clinical reproduction case is required. Prerequisite: ADVS 6200. (5F)

***7510 (d6510). Rumen Physiology and Metabolism.** Discussion of some key aspects of physiology and metabolism of the ruminant digestive tract, with emphasis on the rumen. Topics include anatomy and function; motility; metabolism of protein, carbohydrates, and lipids; rumen microbiology; and common digestive disorders. Prerequisite: ADVS 3510. (2F)

****7540 (d6540). Animal Energetics and Nutrient Metabolism.** Techniques and procedures in measurement of heat production; factors affecting heat production; efficiency of energy utilization in body processes such as work, growth, and synthesis of fats, proteins, and carbohydrates; and the energetic costs of nutrient interconversion and turnover. Prerequisites: ADVS 7510/6510; Chem 5700, 5710. (3F)

****7550 (d6550). Protein Metabolism and Utilization.** Processes involved in the digestion, synthesis, and degradation of protein in the rumen, with special emphasis on protein-energy relationships in the rumen and whole animal. Discussion of protein requirements and efficiency of protein utilization. Prerequisite: ADVS 7510/6510. (3Sp)

***7560 (d6560). Mineral and Vitamin Metabolism.** Principal roles of minerals and vitamins in nutrient metabolism as they apply to animal nutrition. Prerequisite: ADVS 7510/6510. (3F)

7970. Dissertation Research. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of

Art

College of Humanities, Arts and Social Sciences

Head: Professor *Craig J. Law*, photography
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Assistant Heads: Associate Professors *John Neely*, Ceramics; *Christopher T. Terry*, Painting

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Professors *Jon I. Anderson*, graphic design; *Glen L. Edwards*, illustration; *Adrian Van Suchtelen*, drawing; **Associate Professors** *Marion R. Hyde*, printmaking, art education; *Sara J. Northerner*, photography; *Gregory Schulte*, drawing, painting; *Janet Shapero*, sculpture; *Thomas E. Toone*, art history; **Assistant Professors** *Jane S. Catlin*, art education, painting; *Alan Hashimoto*, graphic design; *Lauren Schiller*, printmaking

Degrees offered: Bachelor of Arts (BA), Bachelor of Science (BS), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Art

Undergraduate emphases: Art Education, Art History, Ceramics, Drawing, Graphic Design, Illustration, Painting, Photography, Printmaking, Sculpture; **Graduate specializations:** Ceramics, Drawing, Graphic Design, Illustration, Painting, Photography, Printmaking, Sculpture

Undergraduate Programs

Objectives

The Department of Art's primary goal is to prepare undergraduate students for careers in either teaching or the applied and fine arts. Requirements in ten different emphasis areas address the specific needs of each career. The Department of Art also serves the University community by offering courses in the University Studies program and by offering training in applied art areas for students in related degree programs.

Departmental Admission Requirements

Entering freshmen are admitted to the Department of Art as BS candidates by meeting the Utah State University admission requirements. Entrance to the BFA program in studio art is accomplished by formal application after completion of the department's foundation courses. Students applying for this degree program should have a GPA of at least 2.75. Application to the BFA program is done by portfolio review and should be made during the spring semester in which the prerequisites will be completed. Transfer students should make application during the spring semester prior to their entrance to USU. Participation in the BA program in Art History is limited to students with at least a 2.5 GPA.

Degrees Offered

Bachelor of Science Degree

The BS degree is a general art degree for the student who is not interested in specializing in one area of art. This degree requires 50 semester credits in Art courses, 30 credits in University Studies courses, and allows for 40 elective credits. A GPA of 2.5 in foundation and emphasis courses is required for the BS degree. No grade less than *C* is acceptable in any art class. Art courses may be retaken for a higher grade. This degree does not fulfill the requirements for entrance into graduate schools of art.

Bachelor of Arts Degree

This degree is available primarily to students selecting an emphasis in Art History at USU. BA degree candidates should complete the majority of University Studies lower-division requirements, the modern language requirement, and the foundation curriculum by the end of the sophomore year. This will allow concentration in an area of specialization during the junior and senior years.

In addition, BA candidates must either complete requirements for the Art History Emphasis, as listed below, or the general art requirements as listed under the BS degree. The major professor may also prescribe other courses to serve the particular needs of different students. A minimum of 50 semester credits in art is necessary for this degree.

Bachelor of Fine Arts Degree

The BFA is a professional art degree requiring above-average accomplishment in art. Only students demonstrating considerable promise will be accepted for this more demanding professional degree. Students interested in the BFA degree program should have a GPA of at least 2.75. Application to the BFA program should be made during the spring semester in which the art foundation courses will be completed. For most students, this will occur at the end of their sophomore year. Transfer students may make application during the spring semester prior to their entrance to USU.

A minimum 2.75 grade point **average** in the foundation and basic core and a minimum grade of *B-* in **each** emphasis class is required. Emphasis classes can be retaken for a higher grade. A minimum of 70 semester credits in Art, including 12 semester credits of Art History and 2 credits in BFA exhibition (spring semester), must be completed for the BFA degree. The standard University Studies requirement of 30 credits and 20 credits of electives also apply.

Department of Art Curriculum

Foundation Courses. Students in the BS, BA, and BFA degree programs (except for students in the Art History emphasis) need to complete the following foundation curriculum. (Art History students should *instead* complete the BA foundation courses, which are listed in the *Art History* section.)

Suggested Sequence:
Freshman year: Art 1110, 1120, 1170.
Sophomore year: Art 1130, 2710, 2720.

Subsequent curriculum requirements are specific to these individual emphasis areas:

Art Education. For admission to the program, candidates must be interviewed by the art education professor in the Art Department and must be registered with the College of Education. The art education student works toward a Bachelor of Fine Arts degree requiring 70 art credits. A minimum of 45 credits must be taken in the core and broadening area in art. A minimum of 25 credits must be taken in a specialization area in art. In addition to these art courses, a minimum of 35 credits must be taken in the professional education framework.

See the *Art Major Requirement Sheet*, available from the Art Department, for specific course requirements.

Art History. For the BA degree in Art with an emphasis in Art History, 50 semester credits in the major are required, with a 2.5 grade point average required for graduation. The following foundation classes (21 semester credits) must be completed within the first four semesters: Art 2710, 2720; Hist 1040, 1050; 9 credits chosen from the following courses: Art 1100, 1110, 1120, 1130, Clas 3210, Hist 4230, LAEP 2300, and Phil 3810. Advanced courses (24 semester credits) should be selected from: Art 3820, 3830, 4710, 4720, 4730, 4740, 4750, 4760, and 4900. Four semesters of one foreign language **or** two semesters each of two foreign languages are required. A minor in a related area, or specific courses chosen in consultation with the adviser, is also required.

Ceramics. Contemporary ceramics represents the extension and synthesis of clay sculpture and vessel traditions. Students are acquainted with the technology of ceramic materials and firing processes, while developing sound craftsmanship as a means to personal expression. Enrichment is provided through the ceramics collection of the Nora Eccles Harrison Museum, numerous ceramics exhibitions, and visiting guest artists. Juniors and seniors in the program may compete for one of the Ellen Stoddard Eccles Scholarships, an endowed scholarship fund set aside especially for undergraduate ceramics majors. Students must complete the following courses for a Ceramics emphasis: Art 2140, 2600, 2650, 3610, 3620, 3650, 3660, 4650, 4660; Chem 1010 **or** Chem 1110 and 1130; and Geol 1100 or 1150.

Drawing. Drawing is the two-dimensional study of form and space, as well as the exploration of drawing media, graphic elements, and visual dynamics. It is an essential discipline for all artists, as it provides the fundamental visual skills needed in their search for a personal idiom. At the same time, drawing itself is also a vehicle of creative expression, visual adventure, and self-discovery. Students must complete the following courses for a Drawing emphasis: Art 2140, 2200, 2230, 2600, 2800, 3200, 3210, 3240, 3260, 4250, 4260, 4720, 4730, 4750, 4760, 4910, and 5220. The remainder of the 70 semester credits can be taken as electives.

Graphic Design. Graphic design is the study of visual communications and the art of presenting information to the public or to a specific group. Visual elements such as animation, photography, illustration, symbols, and type are designed or arranged using various techniques and materials. Materials may range from traditional ink, paper, and printing presses to video and the internet, using the latest computer software and hardware. Students graduating from USU with a Graphic Design emphasis will create a professional portfolio individualized to their specific interests. Courses dealing with designing symbols, trademarks, typography, layout, and almost all formats of print and publication design are offered. Digital arts, such as animation and interactive multimedia, are also part of the Graphic Design curriculum. Students will solve commercial visual problems and learn to

present these solutions professionally. Graphic Design emphasis students should complete the following courses: Art 2400, 2810, 3400, 3410, and 3420. Also, 6 semester credits must be chosen from among the following courses: Art 2140, 2200, 2230, 2300, 2600, and 2650. A total of 18 semester credits must be taken in 4000- and 5000-level graphics courses, and 6 semester credits of 4000-level art history courses must be completed.

Illustration. Illustration is the art of graphic communication. To become competent draftsmen and painters, students must understand perspective, anatomy, and design. It is also important that they become familiar with a variety of media and techniques. The student develops skills in researching problems, creating compositions communicating empathy to viewers, and interpreting emotions successfully. A portfolio and a self-promotion will be prepared to show art studios, art directors, art representatives, or other prospective employers. Requirements for the Illustration emphasis are: Art 2200, 2300, 3260, 3350, 3370, 3380, 3390, 3420, 4360, 5200, 5370, and 5380.

Painting. The painting curriculum emphasizes an analysis of historical approaches to painting, and the exploration of new ideas, techniques, and materials. Basic courses are designed to foster a respect for the craft of painting, and subsequent courses encourage application of the craft to expressive goals. Central to the focus of painting study at USU is the development of a personal portfolio reflecting the specific interests of the individual. Students must complete the following courses for a Painting emphasis: Art 2140, 2200, 2220, 2230, 2600, 2650, 3200, 3230, 3240 or 3250, 3260, 4200, 4260, 4750, 4760, 4910, 5200, and 5210.

Photography. Found throughout all of contemporary life, photographic images shape the way we document, interpret, and direct our lives. As an art form, photography constantly reinvents our concept of beauty, reality, and culture. Within the program in photography, students learn the aesthetic and technical skills of the medium. The fundamentals of craft and the "hands on" application of knowledge at each level will enable the student to pursue a variety of photographic professions. Requirements for the Photography emphasis include: Art 2140, 2810, 3810, 3820, 3830, 4810, 4820, 4830, 4910, 5810, 5820, 5830, and 5840.

Printmaking. Students in the printmaking emphasis have the opportunity to explore all aspects of traditional and contemporary printmaking. After an introduction to the basics of intaglio, lithographic, and relief processes, students are encouraged to continue their development in a chosen medium. Independent studio projects will investigate specific problems in the field of printmaking, providing a framework for the student to become engaged in a creative pursuit involving both technical and aesthetic considerations. Requirements for the Printmaking emphasis include: Art 2140, 2230, 2800, 3230, 3240, 3250, and 4250. Also, students must choose two of the following courses: Art 4710, 4720, 4730, 4740, 4750, 4760, and 4910.

Sculpture. Sculpture is the three-dimensional expression of ideas. It may focus on formal issues (such as balance, movement, and texture), or it may use these as means to communicate other concerns. Contemporary sculpture encompasses a wide range of aims, materials, and techniques. It is important for students in the sculpture emphasis to develop a strong base in the fundamentals of sculpture, as well as to have exposure to contemporary sculptural issues. Students must complete the following courses for the Sculpture emphasis: Art 2140, 2600, 2650, 2800, 3610, 3620, 4610, 4630, 5610, 5620, and 6 credits of 4000-level art history courses. Other required courses outside of the Art Department are: two Industrial Technology and Education courses, and one design course taken through Landscape Architecture and Environmental Planning, Theatre Arts, or Human Environments. In addition, Art 3260 is recommended.

Minor Requirements

Art Minor

The requirements for a minor in art are flexible and can be completed in most areas of specialization. Generally, the minimum requirements include Art 1110, 1120, or 1130, depending on area of specialization, plus 3 semester credits from the art history group (Art 1100, 2710, and 2720), and 9-12 credits in a specialization area. To plan a minor in Art, students should meet with an adviser.

USU does not offer an art teaching minor for secondary teachers. Students choosing to train for teaching art in secondary schools must complete the art education major listed under art specialties and must comply with all requirements listed by the Department of Secondary Education.

Art History Minor

A minor in art history requires Art 2710 and 2720, plus 9 credits from the art history group.

Art Work Policy

The Art Department reserves the right to retain any student works of its choice for the purpose of display, exhibition, and addition to the permanent collection.

Graduate Programs

The Department of Art offers two graduate degrees and cooperates with the College of Education on another degree. The Master of Arts (MA) and the Master of Fine Arts (MFA) are offered by the Art Department. A Master of Education (MEd) with a specialization in art is offered through the College of Education.

Master of Arts

Students are selected for the MA program on the basis of a portfolio demonstrating artistic individuality and a level of development beyond the need of classroom instruction.

Admission Requirements

All applicants are required to have earned a bachelor's degree in the visual arts or its equivalent. During the last two years of undergraduate work, the GPA in art courses must have been at least 3.0 on a 4 point scale. MAT scores should be at or above the 40th percentile. Applicants taking the GRE should have verbal and quantitative scores at or above the 40th percentile.

Degree Requirements

Candidates for the MA must complete a minimum of 30 credits, to include: (1) 21 graduate studio credits, which may be divided into two or three areas of study at the graduate level; (2) 3 credits which may be earned in classes outside the department; (3) 3 credits of art history; and (4) 3 credits of Research and Thesis. In conjunction with the thesis exhibition, the student is required to submit bound and illustrated documentation of the thesis project.

A total of 12 credits of art history, including undergraduate credits, is required for graduation, but only 3 credits earned as a matriculated graduate student at USU may be applied toward the 30-credit MA requirement. The additional 9 credits of art history may include credits earned at the undergraduate level.

A candidate must complete a minimum of two semesters in residency. Nine credits per semester is considered full-time graduate enrollment, while 12 credits are considered the maximum enrollment. A minimum of three semesters is thus required to complete the 30-credit program.

Master of Fine Arts

The Master of Fine Arts degree is the terminal degree in the visual arts field. The MFA program is designed to allow students to mature to a level of professional competence in the making of art. Related studies augment a rigorous studio program. The prospective student must exhibit both academic excellence and a well-developed personal artistic vision.

Admission Requirements

All applicants are required to have earned a BFA degree in the visual arts or its equivalent, including a minimum of 12 credits of art history. During the last two years of undergraduate work, GPA in art courses must have been at least 3.0 on a 4-point scale. MAT scores should be at or above the 40th percentile. Applicants taking the GRE should have verbal and quantitative scores at or above the 40th percentile.

Degree Requirements

Students must earn 60 credits, to include: (1) 43 credits of graduate-level studio art as determined by the student in consultation with his or her major professor, including a minimum of 6 credits outside of the emphasis area; (2) 6 credits of Graduate Seminar; (3) 2 credits of Graduate Interdisciplinary Critique; (4) 6 credits outside the Art Department as specified by the supervisory committee; and (5) 3 credits of Research and Thesis, which concludes with an MFA thesis exhibition and an oral defense. The MFA thesis is a visual presentation, the equivalent of a written dissertation in other disciplines. The thesis exhibition is the single most important feature of the MFA program; the culmination of at least two years, and often three or more years, of intensive study in a single discipline. In conjunction with the thesis exhibition, a student must submit bound and illustrated thesis documentation and an adequate selection of slides.

A candidate must complete a minimum of four semesters in residency. Nine credits per semester is considered full-time graduate enrollment, while 12 credits are considered the maximum enrollment. A minimum of five semesters is thus required to complete the 60-credit program; most students require three years.

Application Procedures

Completed applications must include: (1) completed application forms; (2) a letter of intent; (3) transcripts of all previous graduate and undergraduate work; (4) three letters of recommendation from qualified professionals; (5) GRE or MAT scores; and (6) the $40 application fee.

These materials must be sent directly to the School of Graduate Studies. When complete, applications will be forwarded by the School of Graduate Studies to the Art Department for review.

A portfolio of twenty 35mm slides of recent work must be mailed directly to: Department of Art, Utah State University, 4000 Old Main Hill, Logan UT 84322-4000.

Completed applications and slide portfolios must be received by **February 15**. Students should note that applications will be considered *only* at this time, and *only* completed applications will be reviewed. Admission will *only* be considered for fall semester. The deadlines for financial aid may be earlier than the admissions deadline (for example, February 1 for work-study). For further information about financial aid, visit the Financial Aid Office in Taggart Student Center 106; write to: Financial Aid Office, Utah State University, 1800 Old Main Hill, Logan UT 84322-1800; or phone (435) 797-0173.

Applications are reviewed by the Art Department faculty. Candidates are selected primarily on the basis of their **portfolio**, which should demonstrate a level of development beyond the need of classroom instruction and encouragement. The faculty will also look in the portfolio for evidence of significant personal exploration.

Secondary to the portfolio, but important nonetheless, the applicant's **letter of intent** and **letters of recommendation** will also be given careful consideration. In reviewing these letters, the faculty will look for, among other things, indications that the applicant will be capable of prolonged and concentrated effort, guided by realistic personal goals. Letters should address both academic and artistic accomplishments, as well as potential for further growth in both of these areas.

Applicants are strongly encouraged to visit the USU campus and meet with the faculty in their proposed field of study *well in advance* of the February 15 application deadline.

Important Note. Please note that the graduate programs in the Art Department have limited enrollment; admission is *very* competitive. Because only a small fraction of applicants can be accommodated, there can be no guarantee that applicants who meet admission requirements will be acccepted into master's programs.

Financial Assistance

Departmental support is available to graduate students on a competitive basis. Students requesting financial support should apply to the department by February 15. Other assistance is available through the University Financial Aid Office. Students should note that applications for Federal work-study should be mailed during the first week of February.

Art Courses (Art)

BCA 1100. Exploring Art. Introduction to the interesting variety of visual art forms to help students develop an understanding of the basic art elements and fundamental art principles. (3F)

BCA 1110. Drawing I. Introduction to the visual language of drawing, the graphic elements, various drawing media, and the creative problems involved. (3F,Sp)

BCA 1120. Two-dimensional Design. Study and problem solving of form, space, texture, value, and color theory. Required for art majors. (3F,Sp)

1130. Three-dimensional Design. Fosters development of basic understanding of three-dimensional form and space relationships. Includes three-dimensional problem solving, as well as use of a range of materials. Prerequisites: Art 1120. (3F,Sp)

1170. Art Theory and Analysis. Introduces art majors to University and Art Department graduation requirements, learning resources of the University, the Career Services Office, and career opportunities in the arts. Students develop understanding of basic art theory and analysis skills. (3F,Sp)

2140. Drawing II. A continuation of Art 1110, with an emphasis on more complex problems and techniques. Prerequisite: Art 1110. (3Sp)

2200. Painting I. Introduction to visual language of painting. Focuses on organization of visual ideas and basic oil painting techniques. Provides experience in both direct and indirect painting methods, as well as introducing applied color concepts. Prerequisites: Art 1110 and 1120. (3F)

2220. Watercolor Painting. Exploration of formal, technical, and conceptual problems in water media, for students with basic painting experience. Emphasis on gaining proficiency in both transparent and opaque watercolor techniques. Prerequisite: Art 2200. (3F,Sp)

2230. Basic Printmaking. Introductory course to acquaint students with the broader aspects of relief, intaglio, and planographic processes. Prerequisites: Art 1110 and 1120. (3F)

***2300. Basic Illustration.** Drawing, designing, and developing ideas for illustrations. Drawing from the model and homework. Most illustrations done in black and white, using a variety of media. A sketchbook will be required. (3F)

2400. Computers and Art. Basic course dealing with the study and use of the personal computer as a creative medium. Emphasizes hands-on software training directed toward the art of visual design and aesthetic expression. Several projects created using the computer and related peripherals. Discusses various forms of digital output and communications. Critical reviews of art projects focus on the elements and principles of visual design, as well as basic graphic design concepts. Prerequisite: Art 1120. (3F,Sp)

2600. Basic Sculpture. Introduction to additive and subtractive processes in the realization of sculptural ideas. Student involvement in carving, clay modeling, and construction projects. Recommended: Art 1110, 1120, 1130. (3F,Sp)

2650. Introduction to Ceramics. Introduction to basic processes of ceramics and the operation of the USU ceramics lab. Includes handbuilding, throwing, and firing. (3F,Sp,Su)

BHU 2710. Survey of Western Art: Prehistoric to Medieval. Prehistoric art through the end of the Gothic era. (3F)

BHU 2720. Survey of Western Art: Renaissance to Post-Modern. Renaissance through modern. (3Sp)

2800. Introduction to Photography. Overview of photography. Operation of camera and related equipment, exposure and development of black and white and color positive film materials, and enlarging and printing of black and white negatives, with a strong emphasis on composition and photographic aesthetics. (3F)

2810. Photography I. Black and white photography, including camera operation, exposure and development, and enlarging and printing of black and white negatives, with a concern for advancing technical controls, aesthetics, and darkroom experimentation. Introduction to electronic imaging. (3F,Sp)

2900. Introductory Internship/Coop. Introductory level educational work experience in an internship/cooperative education position approved by the Department of Art. (3F,Sp) ®

3000. Secondary Art Methods I. Focuses on developing art curricula by formulating objectives for teaching art history, art appreciation, and the making of art in the secondary schools. Required for Art education majors. (3F,Sp) ®

DHA 3110. Ancient Near East. Survey of history and civilization of ancient Mesopotamia, Egypt, and Israel, from prehistory to 500 B.C. Writing intensive. Prerequisite: Engl 2010 or equivalent. (3F,Sp)

3200. Painting II. Continuation of concepts and techniques covered in Art 2200, emphasizing more complex formal and conceptual problems. Prerequisite: Art 2200. (3Sp)

***3210. Classical Mythology.** Introduces major myths of the Classical world. Explores how these myths serve as keys to understanding the documents and arts of Classical civilization. (3Sp)

3230. Lithography. Investigation of the basic processes employed in lithography, including surface preparation, basic drawing techniques, registration, processing, and printing of the stone or plate, as well as photo, transfer, and color methods. Prerequisite: Art 2230. (3F)

3240. Intaglio. Investigation of the basic processes employed in intaglio, including acid (line etch, aquatint, lift grounds, soft ground) and nonacid (dry point, mezzotint, engraving) techniques, as well as transfer and color methods. Prerequisite: Art 2230. (3Sp)

3250. Relief Prints. Introduction to relief printing, including woodcut, linoleum cut, and wood engraving. Prerequisite: Art 2230. (3F) ®

3260. Anatomy for Artists. Study of principles of anatomical structure of the figure as it applies to two-dimensional and three-dimensional art media. Prerequisites: Art 1110, 2140. (3F)

3300. Clinical Experience I. First clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level I. (1Sp) ®

***3350. Drawing for Illustration.** Encourages drawing with a variety of media. Students will draw from the model in class. Homework consists of filling two 100-page sketchbooks with drawings from life, memory, or photographs. Prerequisite: Art 2300. (3F) ®

***3370. Intermediate Illustration: Concept.** Students develop ideas for illustrations. Student carries one of these ideas through the stages of roughs, a comprehensive, and a finished piece of art. Prerequisite: Art 2300. (3F) ®

***3380. Intermediate Illustration: Technique.** Experience in working with a variety of media (oils, gnoche, acrylic, pastel, ink, watercolor, etc.) on a variety of surfaces (paper, canvas, masonite, illustration board, etc.). Painting from the model and homework, consisting of solutions to an assignment from roughs to a comprehensive and finished illustration. Prerequisite: Art 2300. (3Sp) ®

****3390. Intermediate Illustration: Storybook.** Creation of illustrations appropriate for children's books. Creation of roughs, a story board, a dummy, and three finished illustrations. Students write the story, have someone else write it, or redo a well-known story. (3Sp)

3400. Graphic Design I. Introductory graphic design course, dealing with concepts and principles related to the exploration of typography as an art and design element. Series of exercises designed to give students professional and philosophical look at

aesthetic and functional use of type and related visual elements. Prerequisites: Art 1120, 2400. (3F) ®

3410. Intermediate Computers and Art. Intermediate digital imaging, motion graphics, and interactive multimedia course. Concepts and principles dealing with the art and design of digitally created still art, animation, and interactive presentations. Includes series of exercises designed to further students' understanding of the aesthetic and functional use of the computer as an art medium. Prerequisites: Art 1120, 2400, 3400. (3Sp) ®

3420. Communication Arts Seminar. Lecture seminars by professional guest artists in illustration and graphic design. (1F,Sp) ®

3610. Sculpture: Modeling I. Introduction to the basic structure of the human figure, while at the same time developing skills in modeling clay. Prerequisites: Art 1130, 2600. (3F)

3620. Sculpture: Carving. Introduction to direct and indirect carving through projects in plaster and stone or wood. Prerequisites: Art 1130, 2600. (3F) ®

3630. Public Sculpture. Development of site-specific sculptural ideas, written proposals, and models. Prerequisites: Art 3610, 3620. (3F) ®

3650. Intermediate Ceramics: Handbuilding. Application of traditional ceramic construction techniques to vessel and sculptural subjects. Prerequisite: Art 2650. (3F) ®

3660. Intermediate Ceramics: Throwing on the Potter's Wheel. Focuses on throwing and trimming techniques using the potter's wheel. Emphasizes production of multiples. Prerequisite: Art 2650. (3Sp) ®

3700. Elementary Art Methods. Focuses on developing art curricula by formulating objectives for teaching art processes, art history, and art appreciation in the elementary schools. Required preparation for a grade school teacher. (3F,Sp) ®

3810. Photography II. Advanced black and white photography emphasizing technical controls, including the zone system and introduction to the 4x5 camera. Application of technical skills to enhance creative photographic expression. Continuation of digital imaging and use of computer for sensitometry graphing. Prerequisite: Art 2810 or equivalent experience. (3Sp)

***3820. History of Early Photography.** Reviews early history of photography, beginning before the 1839 public announcement by Daguerre and continuing through the early twentieth century. Explores social change, invention, and the fulfillment of the artist's desire to represent reality. (3Sp)

****3830. History of Contemporary Photography.** Reviews history of contemporary photography, beginning with the modernist movements of the 1920s and progressing through the aesthetic, technical, and communicative changes, up to today's contemporary uses of the medium. Examines photography's relationship to the historical changes in society, through its evolution as an art form, a commercial venue, and a visual record. (3Sp)

4000. Secondary Art Methods II. Focuses on developing methodologies for presenting art concepts and techniques in the secondary schools. Prerequisite: Art 3000. (3F) ®

4200. Advanced Painting Studio. Advanced individual painting projects. Students may use a variety of painting methods to execute a series of closely related paintings that are intended to develop a focused and personal portfolio. Prerequisite: Art 2200. (3-6F,Sp) ®

4250. Advanced Printmaking Studio. In-depth investigation of one printmaking process with emphasis placed on both technical and aesthetic considerations. Prerequisites: Art 2230 and consent of instructor. (1-9F,Sp) ®

4260. Life Drawing. Drawing from live models with emphasis on exploring interpretation, techniques, and compositional approach. Prerequisite: Art 3260. (3Sp) ®

4300. Clinical Experience II. Second clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level II. Prerequisite: Art 3300. (1F) ®

****4360. Fashion Illustration.** Creation of art appropriate for reproduction as fashion illustrations in newspapers, magazines, etc. Emphasizes styles of clothing (women, men, and children) and stylization of the fashion figure. Drawing from the model and homework. Prerequisites: Art 2300, 3350. (3Sp) ®

4400. Graphic Design II. Graphic design production and prepress. Study of concepts and techniques concerning camera-ready art for mass printing. Closely examines process of getting artwork from designer to the presses. Prerequisites: Art 3400. (3F) ®

4410. Advanced Computers in Art I. Advanced graphic design course dealing with motion as an art element. Studies concepts and principles related to the research and development of new ideas concerning various motion graphic techniques and ideas. Includes a series of exercises designed to give the student a professional and philosophical look at the aesthetic and functional use of animation as it relates to business and society. Prerequisites: Art 3400, 4400. (3F) ®

4420. Advanced Graphic Design I: The Graphic Symbol. Advanced graphic design course dealing with concepts, principles, and techniques related to symbols and their applications. Trademarks, logos, pictographs, and labels will be designed and applied to various formats such as letterheads, packages, and digital advertising. Includes a series of exercises designed to give the student a professional and philosophical look at the aesthetic and functional use of symbols as they relate to business and society. Prerequisites: Art 3400, 4400. (3F) ®

4610. Sculpture: Modeling II. Continued study of the human figure, exploring its expressive qualities through the medium of clay. Prerequisites: Art 3610. (3Sp)

4630. Sculpture: Installation. Theoretical and practical experience in development and assessment of sculptural installations. Prerequisites: Art 3610, 3620, 3630. (3Sp) ®

4640. Technology of Ceramic Art. Selected topics in aesthetics and technology of ceramic art, including ceramic history, glaze chemistry and calculation, firing techniques, kiln design and construction, etc. Students enrolling for more than 3 credits arrange credit for directed studies in specific topics. Prerequisites: Art 3650, 3660. (3F,Sp,Su) ®

4650. Advanced Ceramic Studio. Provides time, equipment, and facilities for advanced students to pursue directed studies leading to personal expression through ceramic media. To be repeated during at least four semesters by art majors with ceramics emphasis. Prerequisites: Art 3650, 3660. (3-6F,Sp,Su) ®

4710. Greek and Roman Art. Origin and development of art and architecture of Crete, Mycenae, Greece, and the Roman world. (3)

4720. Renaissance Art. Development of European art and architecture from the thirteenth to the sixteenth century. (3)

4730. Baroque and Rococo Art. Development of painting, sculpture, and architecture in Europe from the late sixteenth through the eighteenth centuries. (3)

4740. Nineteeth Century Art. Painting and sculpture from Neoclassicism to Symbolism. Prerequisite: Art 2720. (3)

***4750. Twentieth Century Art.** History of painting, sculpture, and architecture from post-impressionists to the present. Prerequisite: Art 4710. (3)

4760. American Art. History of painting, sculpture, and architecture in America from colonial times to the present. Prerequisite: Art 2720. (3Sp)

4790. Art History Seminar and Special Problems. Prerequisite: Permission of instructor. (1-6F,Sp,Su) ®

****4810. Digital Photography.** Continued exploration of digital photography, from computer to studio, with strong ties to traditional image making. Digital image processing and use of both software and hardware of digital photography. Study of ethical, artistic, and personal issues. Prerequisite: Art 3810. (3F)

***4820. Nineteenth Century Photography Printing Processes.** Introduction to hand-made photographic emulsions invented and used in the nineteenth century. Production of gum prints, cyanotypes, photogravures, carbon prints, and platinum prints. Explores unique visual characteristics of each process. Includes basic bookbinding. Prerequisite: Art 3810. (3F)

4830. Independent Projects in Photography. Student-initiated, independent projects in photography. Provides opportunity for students to gain technical proficiency and aesthetic creativity. Major emphasis on critiques and group discussions. Prerequisite: Art 3810 or permission of instructor. (1-9F,Sp,Su) ®

4900. Advanced Intership/Coop. Internship/cooperative education work experience in Art. For those students needing complexity and a more professional level of experience in the workplace. (1-9F,Sp) ®

4910. Senior BFA Exhibition. Professional presentation and exhibition procedures. Enrollment limited to senior standing and BFA candidates only. Required for all BFA candidates. Prerequisite: Approval of adviser. (2Sp)

4920. Independent Projects. Student-planned projects, executed through individual initiative and scheduled consultation with instructor. Prerequisites: Art 1110, 1120, 1130. (1-9F,Sp,Su) ®

5200. Figure Painting. Painting from the model, with emphasis on solving problems of the planar structure of the human form. Prerequisites: Art 3200 and 3260. (3F,Sp) ®

****5210. Advanced Painting: Alternative Materials.** Advanced course dealing with painting methods important to modernism and postmodernism. Explores collage, assemblage, and encaustic painting. (3Sp)

5220. Drawing Studio. Independent study. Individually chosen drawing projects focus on central theme and specific approach. Prerequisite: Approval of major professor. (1-9F,Sp,Su) ®

5370. Advanced Illustration. Production of art work suitable for publication in a variety of forms. Organization of portfolio and self-promotion pieces. Painting in class and homework assignments, including comprehensives and finishes. (3F,Sp) ®

5380. Illustration Studio. Production of art work for clients of students' choosing. Client selection based on research and interest. Painting in class and homework assignments, including comprehensives and finishes. (1-9F,Sp) ®

5410. Advanced Computers in Art II. Advanced graphic design course dealing with multimedia as an art element. Studies concepts and principles related to the research and development of new ideas concerning various computer graphic techniques. Includes series of exercises using the interaction between still imagery, animation, and sound to give the student a professional and philosophical look at the aesthetic and functional use of multimedia as it relates to business and society. Prerequisites: Art 3400, 4400. (3F) ®

5420. Advanced Graphic Design II: Word and Image/Visual Continuity. Advanced graphic design course dealing with concepts and principles related to exploration of word as image and ideas of visual continuity. Studies text type and layout. Various communication formats, such as magazines, books, and posters, created using various digital and traditional techniques. Gives students a professional and philosophical look at the aesthetic and functional use of type and related visual elements. Prerequisite: Art 4400. (3Sp) ®

5430. Advanced Graphic Design Studio. Independent research and development of advanced projects in the field of graphic design. Prerequisite: Art 5420. (1-9F,Sp,Su) ®

5440. Advanced Computer Graphics Studio. Independent research and development of advanced projects in the field of digital graphics. Prerequisiste: Art 5420. (1-9F,Sp,Su) ®

5500. Student Teaching Seminar. Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, emphasizing a reflective methodology. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (2F,Sp)

5600. Student Teaching in Secondary Schools. Ten-week culminating practicum in which students assume full-time teaching responsibilities under direction of cooperating teachers in major and minor fields. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (8F,Sp)

5610. Sculpture Seminar. Designed to focus on and challenge current assumptions in regard to contemporary issues in sculpture. Prerequisite: Art 5620. (3F)

5620. Advanced Sculpture Studio. Advanced directed study in specific technical, aesthetic, and/or conceptual issues in sculpture. Prerequisites: Art 4610, 4630. (1-9Sp) ®

5700. Art History Seminar and Special Problems. Emphasizes research and writing skills in selected art history topics. (3F,Sp) ®

***5810. Color Photography I.** Introduction to technical, conceptual, aesthetic, and digital explorations available with exposure and development of color positive and negative films. Investigation of color theory accompanied by production of correctly balanced color prints. Prerequisite: Art 3810. (3F)

***5820. Color Photography II.** Continuation of study with color materials including digital investigations. Explores alternative techniques and manipulative capabilities with color processes. Stresses individual pursuit of color print portfolio. Prerequisite: Art 5810. (3Sp)

****5830. Photographic Studio.** Exploration of the photographic studio, 4x5 view camera, the principles of applied lighting, and the communication of an idea through photography. Commercial, editorial, portrait, and digital photography directed toward professional portfolio preparation. All students required to have 4X5 camera. Enrollment limited to BFA students only. Prerequisite: Art 3810. (3F)

****5840. Photographic Portfolio.** Advanced photography class in preparation for life after graduation. Strong emphasis on work toward a personal professional portfolio (fine art and commercial) and written support documentation (resumes, cover letters, artist statement, etc.). Enrollment limited to BFA students only. Prerequisite: Art 5830. (5Sp)

6100. Graduate Drawing Studio. Advanced individual drawing projects designed to aid in preparation for the thesis project. (3-9F,Sp,Su) ®

6200. Graduate Painting Studio. Emphasizes individual attainment of personal conviction or direction in painting. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6250. Graduate Printmaking Studio. Intensive individual production in advanced printmaking techniques. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6370. Graduate Illustration Studio. (Advertising, Editorial, Fashion.) Techniques in advertising illustration meeting the needs of client and his or her audience. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6400. Graduate Graphic Design Studio. Graphic design problems leading to understanding of major concepts in this area. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6640. Technology of Ceramic Art. Selected topics in aesthetics and technology of ceramic art, including ceramic history, glaze chemistry and calculation, firing techniques, kiln design and construction, etc. Prerequisite: Graduate status. (3F,Sp,Su) ®

6650. Graduate Ceramic Studio. Arranged to provide time, equipment, and facilities for graduate students to pursue directed studies. Tutorial format with group critiques. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6660. Graduate Sculpture Studio. Advanced individual problems in various media and technique. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6710. Graduate Greek and Roman Art. Origin and development of the art and architecture of Crete, Mycenae, Greece, and the Roman world. Prerequisite: Graduate status. (3Sp)

6720. Graduate Renaissance Art. Development of European art and architecture from the thirteenth to the sixteenth centuries. Prerequisite: Graduate status. (3F)

6730. Graduate Baroque and Rococo Art. Development of art and architecture in Europe from the sixteenth to the eighteenth centuries. Prerequisite: Graduate status. (3Sp)

6740. Graduate Nineteenth Century Art. Painting and sculpture from Neoclassicism to Symbolism. Prerequisites: Art 2720 or consent of instructor, graduate status. (3F)

6750. Graduate Twentieth Century Art. History of painting, sculpture, and architecture from the post-impressionists to the present. Prerequisite: Graduate status. (3Sp)

6760. Graduate American Art. History of painting, sculpture, and architecture from the post-impressionists to the present. Prerequisite: Graduate status. (3F)

6790. Art History Seminar and Special Problems. Prerequisite: Graduate status and consent of instructor. (1-6F,Sp,Su) ®

6800. Graduate Photography Studio. Designed to cover several phases of photography, with emphasis on composing what we see in an artistic manner. Allows graduate students to further emphasize their thesis project area of study. Prerequisite: Graduate status. (3-9F,Sp,Su) ®

6900. Graduate Seminar. Deals with general topic of professional practice, including art criticism and how contemporary work relates to current social issues. Prerequisite: Graduate status. (3F,Sp) ®

6910. Graduate Interdisciplinary Critique. Focuses on current work of critique participants. Brings disciplinary analysis to specific problem. Prerequisite: Graduate status. (1F,Sp) ®

6920. Graduate Independent Projects in Art. Advanced problems in emphasis, medium, and idiom of student's choice. Student plans project and executes it through individual initiative and scheduled consultation with the instructor. Prerequisites: Consent of instructor, graduate status. (1-9F,Sp,Su) ®

6970. Research and Thesis. Prerequisite: Candidacy status. (3F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Biological and Irrigation Engineering
College of Engineering

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Professors *Richard G. Allen*, crop water requirements; *Peter F. Gerity*, vice president for research; *Conly L. Hansen*, food engineering; *Robert W. Hill*, water management extension; *Richard C. Peralta*, groundwater; *Linda S. Powers*, bioprocess engineering; *Gaylord V. Skogerboe*, waterlogging and salinity; **Research Professor** *Humberto Yap-Salinas*, drainage; **Research Professor Emeritus** *Gosh Santibrata*, biomaterials; **Professors Emeritus** *Richard E. Griffin*, irrigation extension; *George H. Hargreaves*, crop water requirements; *Jack Keller*, sprinkle and drip irrigation; *Howard B. Peterson*, water quality; *Glen E. Stringham*, surface irrigation; *Lyman S. Willardson*, drainage; **Associate Professors** *Kathryn L. "Kitt" Farrell-Poe*, environmental engineering; *Christopher M. U. Neale*, remote sensing; *Stephen E. Poe*, animal waste treatment; **Associate Professor Emeritus** *Edwin C. Olsen III*, international irrigation; **Assistant Professor** *Gary P. Merkley*, conveyance systems; **Adjunct Assistant Professor** *Dani Or*, soil physics; **Research Assistant Professor Emeritus** *R. Kern Stutler*, irrigation structures; **Research Engineer** *German Sabillion*, surface irrigation

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Biological Engineering; MS and PhD in Irrigation Engineering

Undergraduate emphases: *BS*–Soil and Water Resource Systems Engineering; Food and Bioprocess Systems Engineering; **Graduate**

specializations: *MS, PhD*–Agricultural Hydrology; Crop Water-Yield Analysis; Drainage; Evapotranspiration; Groundwater Management and Simulation; Irrigation Conveyance and Control Structures; Irrigation Project Planning, Design, and Operation and Management; Molecular Biology; On-Farm Water Management; Remote Sensing and Geographical Information Systems; Surface, Sprinkle, and Trickle Irrigation Methods

Undergraduate Programs

Scope and Objectives

The objective of the Biological Engineering Program is to provide students with broad-based engineering skills necessary to solve bioresource problems. Students first learn to integrate biological sciences with conventional studies in mathematics and chemistry. These skills are broadened with a liberal exposure to humanities and social sciences, then sharpened with the study of engineering topics which develop practical problem-solving abilities; expand a sensitivity to the economic, social, and legal dimensions of technical problems; provide an understanding of ethics and professional responsibility; and stimulate a desire for life-long learning.

General biological engineering concepts include the properties of biological materials, electronics and instrumentation, computer use and programming, engineering mechanics, thermodynamics, computer-aided drafting, bio-environmental transport phenomena, hydraulics, and fluid mechanics.

A student selects one of two specialized options in the professional program, either: (1) Soil and Water Resource Systems Engineering; or (2) Food and Bioprocess Systems Engineering. These areas of study are tailored for each student with 24 semester credits of technical electives and one-on-one academic advisement with a member of the faculty. Design is a major theme of both the student's general coursework and specialization, with most courses including open-ended design problems. The entire design experience is brought together in a capstone design course.

In **Soil and Water Resource Systems Engineering**, students focus on problems of irrigation, drainage, remote sensing, groundwater development and protection, water quality, plant water requirements and yield response, and the specific challenges in designing and managing these systems.

Food and Bioprocess Systems Engineering deals with product formulation, design, operation, scale-up, and improvement of manufacturing processes to yield bioproducts at high volume and acceptable costs. Treatment, disposal, and biodegradation of biowastes; processes for obtaining value-added products from renewable resources; and engineering inputs to biotechnology (Protein Engineering) and biotechnology-related industries are also studied.

The Biological Engineering Program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

Requirements

Admission and Graduation Requirements. The student who is majoring in or planning to major in Biological Engineering needs to be aware of the College of Engineering requirements concerning admission to the college, pre-engineering, admission to the professional engineering school, general education, and other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 76-78. It is the responsibility of the student to be aware of these rules and regulations.

Biological Engineering Curriculum

Biological Engineering is divided into a preprofessional and a professional program involving either a four-year or a five-year schedule that will satisfy the requirements for a BS degree in Biological Engineering. Students receiving credit from the College Level Examination Program (CLEP) or from Advanced Placement (AP) may complete a BS degree program in less than four years. The academic work, particularly in the junior and senior years, is supplemented by hands-on laboratories which are required as part of the coursework. Modification in the program to meet special needs and priorities of a student may be obtained with the approval of the department head and adviser.

Preprofessional Program: BIE 1880, 2330; Chem 1210, 1230, 2300; ECE 2200; Engr 1010, 2000, 2020, 2200; Biol 1210; Engl 2010; ITE 2270; MAE 2400; Math 1210, 1220, 2250; Phyx 2220, and three credits of communication literacy.

Professional Program: BIE 2330, 3200, 3670, 3870, 4880, 4890; Biol 5200; CEE 3500; Chem 3700, 3710; Biological Engineering Electives (6-18 credits); Math and Science Electives (0-8 credits); Technical Electives (6-18 credits); and University Studies (21 credits).

Additional Information

For more information about the Bachelor of Science requirements and the sequence in which courses should be taken, see major requirements sheet, available from the Biological and Irrigation Engineering Department.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the department employs students to assist in engineering research and development. Cooperative education and industrial employment opportunities for students are coordinated by the University Placement Office.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. Admission committees also consider experience, undergraduate record and curriculum, and formal recommendations. A student without an undergraduate engineering background will be required to

complete selected undergraduate courses prior to or concurrently with enrollment in graduate courses.

Prerequisites for Matriculation. Students who are admitted provisionally or who have been changed from matriculated to probationary matriculated status will have their records reviewed by a faculty committee when they have completed 12 credits of coursework (among which must be formal engineering courses) or at the end of their second semester at USU. Those students who have earned a 3.0 GPA at that time and desire to be matriculated may apply to the department to have their status changed. If they meet all other academic requirements of the School of Graduate Studies and the department, they will be matriculated and admitted to the degree program. When a student is admitted as a degree candidate, the committee may allow up to 12 credits taken while on nonmatriculated status to be transferred. Nonmatriculated students may continue to study at USU but without degree candidate status. At the end of their studies, nondegree students are granted a Certificate of Completion.

Prerequisite Requirements. All students must have had **formal** courses in engineering hydraulics, computer programming (C, FORTRAN, BASIC, or PASCAL), hydrology, and at least one year of calculus. Students without this background can satisfy these requirements by taking the appropriate undergraduate courses at USU. An additional year of calculus (Math 1210, 1220, and 2250, or equivalent) is required for the MS degree in Irrigation Engineering and for all PhD programs. These background courses will not be counted toward the degree credit requirements.

MS in Biological and Agricultural Engineering and in Irrigation Engineering

Students must have a BS from an ABET-accredited engineering program in the U.S. or its equivalent in their home countries or must take the make-up coursework required for a BS in engineering at USU. It is assumed that the bachelor's degree mathematical training includes courses in calculus, linear analysis, and differential equations.

Three MS options are available: research (Plan A), technical practice (Plan B), and training/extension (Plan C). All MS students are admitted initially into the technical practice (Plan B) option. They may subsequently transfer to one of the other two options depending upon interests and skills.

Research Option. Students wishing to gain experience in irrigation research may select the research option, particularly if they have a long-term goal of PhD study. The minimum requirements for this option are 30 credits, of which 8 may be awarded for the thesis.

Technical Practice Option. Some students wishing to study for the biological and agricultural engineering, or irrigation engineering, degree may not be interested in pursuing a PhD degree or in doing the research necessary for a thesis. For such students, the technical practice (Plan B) option is offered. The requirements for the degree are similar to those for the research option, with the exception of the thesis. The 8 thesis credits are replaced by 4 credits for a significant engineering report or design project and 4 additional credits of coursework. The minimum course requirement for the technical practice option is 30 approved graduate credits.

Training/Extension Option. Students expecting to terminate their graduate studies at the MS level and wishing to develop an emphasis in the training and/or extension fields of biological and agricultural engineering, or irrigation engineering, may choose the training/extension option (Plan C). The same engineering BS or equivalent requirements noted under the Plan A option apply. The minimum requirements for this degree are 30 approved graduate credits. No report or thesis is required. The degree requirements under this option can be met by taking courses.

Doctor of Philosophy

Two PhD programs are offered in the department: (1) **Biological and Agricultural Engineering,** and (2) **Irrigation Engineering**. Students who have completed an MS with a thesis (Plan A or equivalent) in an engineering discipline are eligible to apply for admission to a PhD program in either biological and agricultural engineering or in irrigation engineering. Admission will be based on the students' prior academic records and, if they are graduates of USU, the recommendations of their graduate committees. It is assumed that students are adequately prepared in mathematics and engineering design courses to compete at the PhD level. If such is not the case, a program of courses to make up the deficiency will be required.

In addition to any prescribed review courses and seminars, the minimum requirements for a PhD program include 60 credits of approved graduate courses beyond a master's degree, satisfactory completion of the comprehensive examinations after completion of the formal coursework, and the writing of a dissertation based on an original research project. The degree requirements beyond a master's degree can be met by taking courses in engineering design, synthesis, and systems; mathematics; and related science.

Three credits of teaching experience are required. The PhD candidate will be assigned to a course during the final year of study and will be responsible for up to seven lectures in the course. The candidate will be supervised by the regularly appointed instructor and will assist him/her in homework grading, examination development and grading, and student advising.

Research

The Biological and Irrigation Engineering Department is housed in the Peterson Engineering Building. In addition to the modern classrooms and laboratories in the Engineering Building, the department controls a 110-acre research farm west of Logan and a laboratory on Logan River for studying irrigation and drainage problems in the field. The department also cooperates in irrigation and drainage research projects with Utah Agricultural Experiment Station researchers, commercial farms, and the USDA Agricultural Research Service, and works with the Utah Water Research Laboratory in conducting the graduate program of the department.

In more than 80 years of irrigation engineering experience, USU has attained worldwide prestige through the successful professional records of its many graduates.

The department emphasizes a program in agricultural resource engineering addressed toward defining reasonable agricultural goals on a farm, community, regional, continental, or global basis, and providing a strategy for organizing and managing water resources with other resources (physical, human, economic, biologic, and natural) that must be brought together to reach desired production and environmental goals.

The department is heavily involved in overseas research and

training activities concerned with managing irrigation systems, on-farm water management, and water resource development.

Research projects in several areas of irrigation and drainage engineering are currently being conducted by the department. Hence, graduate students have the opportunity to conduct research for their degree programs and obtain financial support. Current projects include hydraulics of surface irrigation, consumptive use, return flow quantity and quality of irrigation waters and application techniques, transient flow in tile drainage systems, drain envelopes, sprinkler irrigation, trickle irrigation, crop production and water requirements, salt movement, regional groundwater modeling for optimizing sustainable yield, conveyance system modeling and control, and remote sensing.

Specific research projects in the bioprocessing option include ventilation and environmental control of livestock buildings, the contribution of rural municipalities to nonpoint source pollution, and agricultural waste management.

Land application of food processing wastes, extrusion of dairy-based foods, multi-stage anaerobic digestion of biological materials, functional properties of foods, and biological detoxification of metals are some of the topics researched in food engineering.

Financial Assistance

The large departmental research programs make it possible to offer graduate students financial support in the form of assistantships and traineeships. The financial support is mainly available to U.S. citizens with a small number of assistantships for others. The traineeships and assistantships are attached to research projects on the Logan campus and overseas. Traineeships carry tuition waivers and additional financial support.

Career Opportunities

Development of irrigation systems is one of the oldest human engineering endeavors. Irrigation makes arid land productive and provides both flexibility in cropping patterns and crop insurance in humid areas. Agricultural and irrigation engineering will be a major factor in solving world food problems. In water resource management, irrigation is a major consumptive user of water and has a significant influence on the quality change in the waters of streams. With world food problems and water pollution in the spotlight, superimposed on a mounting demand for water by all users (irrigation, power, industry, municipal, culinary, navigation, recreation, and fish and wildlife), the challenge facing the irrigation engineer has never been greater and the opportunities and future have never been brighter.

The close association with departments in the colleges of Engineering; Agriculture; Business; Natural Resources; Science; and Humanities, Arts and Social Sciences strengthens the departmental program and permits a broad multidisciplinary approach for those wishing special emphasis in related aspects of the science.

Additional Information

Two guides are available from the department to assist students: (1) *Report, Thesis, and Dissertation Format Guidelines and Policies*, and (2) *Policies and Procedures for Graduate Study.*

Biological and Irrigation Engineering Courses (BIE)

1880. Engineering Quantification of Biological Processes. Introduction to engineering practice of biological modeling and quantification of biological processes. Introduction to transport of heat and mass; bioenergetics, thermodynamics, and enzyme kinetics; metabolism; mechanical work processes; and agroecosystems modeling in biological systems. (3Sp)

2330. Engineering Properties of Biological Materials. Relationships between composition, structure, and properties of biological materials. Definition, measurement, and use of mechanical, thermal, electromagnetic, chemical, and biological properties in computation and design. Prerequisites: Biol 1210, 1230, Chem 1210, BIE 1880. (3Sp)

3000. Instrumentation for Biological Systems. Fundamentals of measurement systems used in agricultural, biological, and environmental applications. Selection and use of sensors, data acquisition systems, and elementary controls. Prerequisite: ECE 2200. (2Sp)

3200. Introduction to Unit Operations in Biological Engineering. Introduction to the fundamental unit operations required to process biological materials in bioprocessing, biomedical, and food engineering applications. Integration of biology and chemistry into biological engineering using basic concepts in heat, mass, and energy conservation and transport. Prerequisites: BIE 2330, Chem 2300. (3Sp)

3670. Transport Phenomena in Bio-Environmental Systems. Core course in both biological and environmental engineering. Students develop a detailed understanding of the principles, concepts, modes, and methods of calculating heat and mass transfer. Emphasis given to contaminant and nutrient flux, along with their state transformations, in order for the biological or environmental engineer to evaluate options for production, clean-up, and control of bio-environmental systems. Prerequisite: CEE 3500. (3Sp)

3870. Biological Engineering Design I. Students select and plan a senior design project. A project proposal, including a technical description of the project and management plans, is required. (1F,Sp,Su)

4250. Cooperative Practice. Planned work experience in industry or government. Detailed program must be approved prior to registration. Written report required. (3F,Sp,Su)

CI 4880. Biological Engineering Design II. Execution and completion of a comprehensive senior design project. Design reviews and written reports are required. Prerequisite: BIE 3870. (3F,Sp,Su)

CI 4890. Biological Engineering Design III. Preparation and presentation of the senior design project. The presentation will involve a professional standard report and an evaluation and critique by Biological Engineering students and faculty. Prerequisite: BIE 4880. (3F,Sp,Su)

4930. Special Studies. Independent or group study of biological and irrigation engineering subjects not covered in regular course offerings. (2F,Sp,Su) ®

5010 (d6010).[1] Principles of Irrigation Engineering. Soil-water-plant relationships; evapotranspiration and water requirements; effective water use; irrigation scheduling; infiltration; irrigation systems planning. Prerequisites: CEE 3430, 3500, Engr 2200. (3F)

5110 (d6110). Sprinkle and Trickle Irrigation. Sprinkle and trickle irrigation system demand, system selection and configuration, emitter and sprinkler characteristics and sizing, uniformity and efficiency, pipe network layout and sizing, and system operation, management, and maintenance. Prerequisite: BIE 5010/6010. (4Sp)

5150 (d6150). Surface Irrigation Design. Design and evaluation of surface irrigation systems. Field measurements for evaluating and improving uniformity and

efficiency. Simulation of surface systems. Land leveling computation and equipment. Prerequisite: BIE 5010/6010. (3Sp)

5250 (d6250). Remote Sensing of Land Surfaces. Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: Basic calculus and physics. (4Sp)

5300 (d6300). Irrigation Conveyance and Control Systems. Design, evaluation, and operation of irrigation distribution systems. Measurement and monitoring of flows and water levels, and canal and pipeline automation. Simulation of system hydraulics. Prerequisite: BIE 5010/6010. (3Sp)

5350 (d6350). Drainage and Water Quality Engineering. Introduction to principles and practices of drainage. Engineering investigation and design of drains. Formation and function of wetlands caused by irrigation and drainage systems. Prerequisite: BIE 5010/6010. (3Sp)

5520 (d6520). Irrigation Project Operation and Maintenance. Organizing, administering, and financing irrigation and drainage projects. Operation and maintenance of irrigation distribution systems. Simulation of command area water demands. Prerequisite: BIE 5010/6010. (3Sp)

5550 (d6550). Design of Wells and Well Systems. Groundwater exploration; well drilling and testing; pumping plant design, operation, and testing; aquifer evaluations; siting of multiple well systems. Development of pumping strategies for water supply and environmental control systems. Introduction to conjunctive use. Prerequisite: BIE 5010/6010. (3Sp)

5610 (d6610). Food and Bioprocess Engineering. Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200 (3F)

5810 (d6810). Biochemical Engineering. Fundamentals of bioreactor design and bioengineering. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

5830 (d6830). Management and Utilization of Biological Solids and Wastewater. Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

5850 (d6850). Biomaterials Engineering. Explores identification and modification of properties of natural and artificial biomaterials. Design of applications for by-product recovery and recycling, environmental, food processing, and biomedical industries. Commercialization of biomaterial feed stocks, biotechnology output, and bioprocessing by-products into traditional and alternative products. Prerequisites: BIE 2330, 5610/6610. (3F)

6010 (d5010). Principles of Irrigation Engineering. Soil-water-plant relationships; evapotranspiration and water requirements; effective water use; irrigation scheduling; infiltration; irrigation systems planning. Prerequisites: CEE 3430, 3500, Engr 2200. (3F)

6110 (d5110). Sprinkle and Trickle Irrigation. Sprinkle and trickle irrigation system demand, system selection and configuration, emitter and sprinkler characteristics and sizing, uniformity and efficiency, pipe network layout and sizing, and system operation, management, and maintenance. Prerequisite: BIE 6010/5010. (4Sp)

6150 (d5150). Surface Irrigation Design. Design and evaluation of surface irrigation systems. Field measurements for evaluating and improving uniformity and efficiency. Simulation of surface systems. Land leveling computation and equipment. Prerequisite: BIE 6010/5010. (3Sp)

6250 (d5250). Remote Sensing of Land Surfaces. Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: Basic calculus and physics. (4Sp)

6260. Hydrology of Irrigation Agriculture. Impacts of irrigation activities on local and regional hydrology, wetlands, and natural systems. Determination of components of field and project water balances, including evapotranspiration. Effects of water conservation practices and changes in efficiency on timing and disposition of water resources and return flows. Irrigation scheduling and use of computer models. Prerequisite: BIE 6010/5010. (3)

6300 (d5300). Irrigation Conveyance and Control Systems. Design, evaluation, and operation of irrigation distribution systems. Measurement and monitoring of flows and water levels, and canal and pipeline automation. Simulation of system hydraulics. Prerequisite: BIE 6010/5010. (3Sp)

6350 (d5350). Drainage and Water Quality Engineering. Introduction to principles and practices of drainage. Engineering investigation and design of drains. Formation and function of wetlands caused by irrigation and drainage systems. Prerequisite: BIE 6010/5010. (3Sp)

6520 (d5520). Irrigation Project Operation and Maintenance. Organizing, administering, and financing irrigation and drainage projects. Operation and maintenance of irrigation distribution systems. Simulation of command area water demands. Prerequisite: BIE 6010/5010. (3Sp)

6550 (d5550). Design of Wells and Well Systems. Groundwater exploration; well drilling and testing; pumping plant design, operation, and testing; aquifer evaluations; siting of multiple well systems. Development of pumping strategies for water supply and environmental control systems. Introduction to conjunctive use. Prerequisite: BIE 6010/5010. (3Sp)

6610 (d5610). Food and Bioprocess Engineering. Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200 (3F)

6810 (d5810). Biochemical Engineering. Fundamentals of bioreactor design and bioengineering. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

6830 (d5830). Management and Utilization of Biological Solids and Wastewater. Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

6850 (d5850). Biomaterials Engineering. Explores identification and modification of properties of natural and artificial biomaterials. Design of applications for by-product recovery and recycling, environmental, food processing, and biomedical industries. Commercialization of biomaterial feed stocks, biotechnology output, and bioprocessing by-products into traditional and alternative products. Prerequisites: BIE 2330, 6610/5610. (3F)

6930. Special Problems. Independent study of problems in biological and agricultural engineering. (2F,Sp) ®

6970. Thesis Research. Credit for MS research and report requirements. (1-8F,Sp,Su) ®

6990 (d7990). Continuing Graduate Advisement for MS and PhD Students. (1F,Sp,Su) ®

7350. Optimal Groundwater Management. System analysis techniques applied to aquifer and stream/aquifer management. Development of economically,

quantitatively, and environmentally optimal strategies for alternative water policies. Modeling techniques for managing aquifer systems under volumetric, economic, and environmental management goals. Prerequisites: CEE 5470/6470 or 6500. (4Sp)

7600. Advanced Research Topics. Study of advanced biological and engineering topics. Analysis of project scale water management issues, software development, crop modeling, advanced drainage systems, remote sensing, groundwater systems, and other topics taken from the research interests of the faculty. Prerequisite: PhD enrollment. (3Sp)

7970. Dissertation Research. (1-10F,Sp,Su) ®

7990 (d6990). Continuing Graduate Advisement for MS and PhD Students. (1F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Biology

College of Science

Head: Professor *Edmund D. Brodie, Jr.*, behavior and evolution
Office in Biology-Natural Resources 121, (435) 797-2485

Associate Head: Professor *Keith A. Mott*, plant physiology
Director of Undergraduate Studies: Associate Professor *Richard J. Mueller*, plant anatomy

Director of Graduate Studies: Associate Professor *John M. Stark*, microbial ecology and biogeochemistry

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Professors *Anne J. Anderson*, plant pathology; *Kandy Baumgardner*, genetics; *William A. Brindley*, entomology and toxicology; *LeGrande C. Ellis*, endocrinology and reproductive physiology; *James A. Gessaman*, vertebrate physiological ecology; *Joseph K.-K. Li*, virology; *James A. MacMahon*, community ecology; *Frank J. Messina*, insect biology; *William J. Popendorf*, industrial hygiene; *Jon Y. Takemoto*, microbial physiology; *Sherman V. Thomson*, plant pathology; *Nabil N. Youssef*, cellular biology and parasitology; **Associate Professors** *Diane G. Alston*, integrated pest management; *Mary E. Barkworth*, plant systematics; *E. W. "Ted" Evans*, insect ecology; *James W. Haefner*, systems analysis; *Bradley R. Kropp*, ecology, genetics, and systematics of fungi; *Gregory J. Podgorski*, developmental biology; *Peter C. Ruben*, neurobiology; *Kimberly A. Sullivan*, behavioral ecology; *Dennis L. Welker*, molecular biology; *Paul G. Wolf*, systematics and molecular biology; **Assistant Professors** *Daryll B. DeWald*, plant molecular biology; *James D. Fry*, quantitative genetics; *Joseph E. Mendelson, III*, vertebrate systematics; *Carol D. von Dohlen*, insect biology; **Professors Emeriti** *Thomas L. Bahler*, histology, human physiology and anatomy; *George Bohart*, bee biology and entomology; *Donald W. Davis*, entomology and pest management; *Keith L. Dixon*, ornithology and mammalogy; *B. Austin Haws*, entomology and pest management; *Ting Hsiao*, insect physiology and biochemistry; *Gene W. Miller*, plant biochemistry and physiology; *Ivan G. Palmblad*, evolutionary ecology; *Frederick J. Post*, aquatic microbiology and microbial ecology; *Reed S. Roberts*, entomology; *Richard J. Shaw*, vascular plant taxonomy; *John R. Simmons*, biochemical genetics; *John J. Skujins*, soil biochemistry and microbial ecology; **Associate Professors Emeriti** *Wilford J. Hansen*, systematic entomology; *Raymond I. Lynn*, algology and microbial ecology; *George W. Welkie*, plant physiology and virology; **Research Professor** *Donald W. Roberts*, insect pathology; **Research Associate Professor** *Darwin L. Sorensen*, aquatic microbiology; **Research Assistant Professor** *Joanne E. Hughes*, molecular genetics; **Adjunct Professors** *Ray W. Brown*, forestry; *Mark C. Healey*, zoology; *William P. Kemp*, insect ecology; *W. David Liddell*, geology; **Adjunct Associate Professors** *John C. Bailey*, public health; *Michael J. Jenkins*, forestry; *Jay B. Karren*, entomology; *J. Dennis O'Dell, M.D.*, attention-deficit hyperactivity disorder; *Vincent J. Tepedino*, entomology; **Adjunct Assistant Professors** *Noelle E. Cockett*, biotechnology; *Philip F. Torchio*, bee biology; **Adjunct Research Associate Professor** *Jordi Bosch*, bee biology; **Clinical Assistant Professor** *Daniel A. Boston, DDS*, dentistry; **Principal Lecturer** *David M. "Andy" Anderson*, medical technology; **Lecturer** *Alice Lindahl*, invertebrate biology
Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Biology; BS and BA in Composite Teaching—Biological Science; BS in Public Health; MS and PhD in Biology Ecology; MS and PhD in Toxicology is avaliable through the Interdepartmental Program in Toxicology.

Undergraduate emphases: *Biology BS, BA*–Biology, Cellular/Molecular, Ecology/Biodiversity, Environmental; *Public Health BS*–Industrial Hygiene, Environmental Health, Public Health Education; **Graduate specializations:** *Biology MS, PhD*–Molecular Biology (see pages 299-300).

Undergraduate Programs

Objectives

Biology. The Department of Biology offers programs leading to a Bachelor of Science or Bachelor of Arts degree. Majors will complete a core of courses which provide an understanding of biological principles. Upper-division courses provide integration, in-depth study, and an opportunity for specialization within the different degree emphases. Additional coursework in chemistry, physics, statistics, and mathematics provides knowledge and analytical skills in these important related fields. Most biology degrees provide a foundation for graduate work. Biology majors can add a minor area of study, such as business or chemistry, to enhance their employment opportunities.

Prehealth Professions Programs. The Biology Department supervises premedical, predental, and other health professions. These programs satisfy entrance requirements for most medical and dental schools in the United States and Canada and are recognized for the high quality preprofessional preparation they provide. After four years, the student receives a BS degree in Biology or another major. **Adviser**: Susan Haddock, BNR 101.

Public Health. The Department of Biology offers preprofessional training in public health. Individuals completing the BS degree have employment opportunities in such areas as environmental health, industrial hygiene, public health education, administration, nursing, nutrition, mental health, and social work. **Adviser**: David Drown, BNR 343.

The Department Head, the Director of Undergraduate Studies, and advisers in the Department of Biology are available to provide undergraduate majors with additional information regarding specific programs and career opportunities. The Departmental Advising Center and the Director of Undergraduate Studies are located in BNR 101. Program requirements, advising information, and an **"Ask an Adviser"** e-mail service are on the Biology Department web page at **http://www.biology.usu.edu**

Students with majors in the Department of Biology should consult with their advisers regularly as they plan their course of study. Students have the responsibility to keep themselves aware of major requirements and course prerequisites. General requirements, specific course offerings, and the semesters that courses are taught may change.

Mathematics is an important and required skill to enhance one's success in the sciences. Proper course level placement in mathematics at the beginning of the degree program is essential. Students should consult with an adviser to determine the appropriate level to begin their mathematics studies for meeting requirements and completion of their major. For detailed information, obtain an official Major Requirement Sheet from the Biology Advising Center.

Requirements

University Requirements. Students are responsible for meeting all University requirements for total credits, upper-division credits, credits of *C-* or better, and the University Studies Program. (See pages 47-53 in this catalog.)

College of Science Requirements. All college requirements are met by completing the departmental degree requirements; no additional coursework is required.

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to the Biology and Public Health majors. Transfer students from other institutions need a 2.25 transfer GPA, and students transferring from other USU majors need a 2.25 total GPA for admission to the Biology and Public Health majors in good standing. Admission requirements differ for the Composite Teaching–Biological Science Major, as explained below.

Admission Requirements for the Composite Teaching—Biological Science Major. New freshmen admitted to USU in good standing qualify for admission to this major. To qualify for admission to the Secondary Teacher Professional Education Framework, new freshmen must acquire a cumulative 2.75 GPA and 60 credits of coursework. Transfer students from other institutions or other USU majors need a cumulative 2.75 GPA and 60 credits of coursework to be admitted to the major and the Secondary Teacher Professional Education Framework. For information on additional admission criteria, students should contact the Department of Secondary Education.

GPA Requirement. To graduate, a candidate for any bachelor's degree offered by the Department of Biology must maintain a grade point average of 2.25 in all Biology Department courses required for the major (Composite Teaching also requires a 2.75 cumulative GPA) and a grade of *C-* or better in Biol 1210, 1220, 1230, and 1240. The *Pass-Fail* option is not acceptable for any course required for the degree, but *D* grades are permitted within the restrictions of the 2.25 GPA. The Composite Teaching—Biological Science Major requires a cumulative overall GPA of 2.75 for admission and graduation. The 2.25 GPA requirement applies to the Biology, Public Health, and BioMath minors.

BS degree in Biology. Four different emphases are available within the Biology degree. The **Biology Emphasis** is the most flexible option. Electives may be selected in any subdiscipline the student wishes to emphasize; e.g., botany, ecology, zoology, entomology, microbiology, etc. The **Cellular/Molecular** and **Ecology/Biodiversity** emphases provide more directed training that is appropriate for research or other technical employment in academic institutions, government agencies, and the private sector. They also provide excellent preparation for graduate work. The **Environmental Emphasis** prepares students in the biological and physical sciences as they relate to environmental problems and concerns. This degree serves as a foundation for graduate work and provides practical training for employment at the bachelor's degree level. Emphases will be listed on transcripts to indicate the student's specialization. The course requirements are as follows:

Biology Emphasis: Biol 1210, 1220, 1230, 1240, 2200, 2220; Biol 3300 or 4200; Biol 5250; one of Biol 2410, 3050, 3220, 4500, 5400, 5530, 5550, 5560, or 5570; a physiology course with a lab selected from: Biol 4400 or 5300 or 5540; or Biol 5520 with one of Biol 5500, 5510, or 4510; 10 credits of 4000-level and above Biol prefix courses as electives. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; Phyx 2110, 2120; Math 1210; and Stat 3000.

Cellular/Molecular Emphasis: Biol 1210, 1220, 1230, 1240, 2200, 2220, 4100, 4200, 5190, 5250; a physiology course with a lab selected from: Biol 4400 or 5300 or 5540; or Biol 5520 with one of Biol 5500 or 5510; one of Biol 5160, 5240, or 5260; nine

elective credits from: Biol 3300, 5060, 5100, 5150, 5330, 5340, 5440, 5450, 5800. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 5700, 5710, 5720; Phyx 2110, 2120; Math 1210; and Stat 3000.

Ecology/Biodiversity Emphasis: Biol 1210, 1220, 1230, 1240, 2200, 2220, 3220, 3300, 5250; a physiology course with a lab selected from: Biol 4400 or 5300 or 5540; or Biol 5520 with one of Biol 5500, 5510, or 4510; one of Biol 2400, 2410, or 5400; one of Biol 4500, 5530, 5550, 5560, 5570 or 5580; one of Biol 5170, 5200, or 5590; an additional course from one of the three previous groups or the following list: Biol 4100, 5310, 5350 or 5800. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; Phyx 2110, 2120; Math 1210; Stat 3000; Soil 3000; and Geol 1150.

Environmental Emphasis: Biol 1210, 1220, 1230, 1240, 2200, 2220, 3220, 3300, 5250; a physiology course with a lab selected from: Biol 4400 or 5300 or 5540; or Biol 5520 with one of Biol 5500, 5510, or 4510; one of Biol 2400, 2410, or 5400; twelve elective credits from: Biol 4500, 5050, 5200, 5310, 5320, 5410, 5800; PubH 3610; CEE 5620; ADVS 5400; ADVS 5750; Geol 1150; Soil 3000. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3600, 3610, 3700, 3710; Phyx 2110, 2120; Math 1210; and Stat 3000.

BS Degree in Composite Teaching—Biological Science. The Composite Teaching—Biological Science Major leads to certification to teach in secondary schools. The course requirements are as follows: Biol 1210, 1220, 1230, 1240, 2000, 2200, 2220, 3220, 3300, 4100, 5250; a physiology course with a lab selected from: Biol 4400 or 5300 or 5540; or Biol 5520 with one of Biol 5500, 5510 or 4510; Geol 1150; Sci 4300; Math 1210; Stat 3000; Phyx 2110, 2120; Chem 1110, 1120, 1130. In addition, students must be accepted into the Professional Education Framework and complete the following: InsT 3000; SpEd 4000; ScEd 3100, 3200, 3300, 3400, 4100, 4200, 4300, 4400, 5100, 5200, 5300, 5500, and 5600.

BA Degrees in Biology and Composite Teaching—Biological Science. The student must complete the requirements for the BS (above) plus two years of a foreign language. (See page 48 of this catalog.)

BS Degree in Public Health. A four-year program leading to the Bachelor of Science in Public Health is offered by the Department of Biology with options in the following areas: environmental health, industrial hygiene, and public health education. Individuals completing the environmental health option are qualified to take the Registered Sanitarian's Examination. Those completing the industrial hygiene option qualify to sit for examination by the American Board of Industrial Hygiene following one year of professional experience. The Public Health degree requires a core of biology courses similar to that required for the biology degrees; additional biology and public health courses; and chemistry, physics, mathematics, statistics, and allied science and engineering courses appropriate to each emphasis. Three different emphases are available. The course requirements are as follows:

Industrial Hygiene Emphasis: Biol 1210, 1220, 1230, 1240, 2000, 2200, 2220, 3300; PubH 3310, 3610, 5020, 5310, 5320, 5330, 5350, 5500; ADVS 5400; one of Biol 5050 or CEE 3780. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3600, 3610, 3700, 3710; Phyx 2110, 2120; Math 1210, 1220; and Stat 3000.

Public Health Education Emphasis: Biol 1210, 1220, 1230, 1240, 2000, 2200, 2220, 3300; PubH 3120, 3610, 4000, 5000, 5010, 5020, 5500; Spch 1050; NFS 1020, 5210; Soc 3330, 3500; HEP 2000, 2500, 3000, 4000, 4400. In addition, students must complete: Chem 1120, 1210, 1220, 1230, 1240; Phyx 1200; Math 1210; and Stat 3000.

Environmental Health Emphasis: Biol 1210, 1220, 1230, 1240, 2000, 2200, 2220, 3300, 5050; PubH 3310, 3610, 4000, 5000, 5010, 5020, 5310, 5500; NFS 5110; seven elective credits from: Biol 2400, 3050, 3220, 5550; Soil 3000; Spch 1050; ADVS 5400; and Chem 3700, 3710. In addition, students must complete: Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340; Phyx 2110, 2120; Math 1210; and Stat 3000.

Biology Minor. The Biology minor requires completion of the following: Biol 1210, 1220, 1230, 1240; and 12 credits of upper-division (3000-level and above) Biol prefix courses.

BioMath Minor. This minor requires mathematics and quantitative biology courses beyond those required for the basic biology degrees. It is an excellent option for students considering graduate work. Biology majors may take this minor through the Mathematics and Statistics Department. For details, contact the Biology Advising Center (BNR 101) or James Haefner (BNR 233).

Public Health Minor. The Public Health minor requires completion of the following: Biol 1210, 1220, 1230, 1240; and 12 credits of upper-division (3000-level and above) Public Health elective courses.

Honors. An Honors Plan is available for students desiring a BS or BA degree “with Honors” in Biology. Departmental Honors requires the completion of a research-based Bachelor's Thesis. For details, students should contact Richard Mueller (BNR 101).

Field Trips. Many biology courses require field trips. Those enrolled are expected to dress appropriately for the conditions and observe any safety precautions issued by instructors. Many courses require modest laboratory fees.

Undergraduate Research—Bachelor's Thesis in Biology

Students may do undergraduate research work under the supervision of selected faculty members. To participate and receive academic credit, a student must enroll in Biol 5800, Undergraduate Research. To complete the research project and write a thesis, a student must be enrolled in Biol 5810, Bachelor's Thesis, for 3 credits. A thesis supervisory committee must be organized, consisting of an approved biology faculty member and at least one other faculty member. The supervisory committee is subject to the approval of the Director of Undergraduate Studies. Three credits of Biol 5800 or 5810 may be applied toward elective requirements in some degree programs. Contact the Director of Undergraduate Studies, BNR 101, for assistance.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available from the University. Both the College of Science and the Department of Biology offer scholarships. Contact the College of Science office (SER 101) and the Biology Advising Center (BNR 101) for details.

Graduate Programs

Admission Requirements

See general admission requirements on pages 60-61. To be recommended for matriculated status, an applicant must have earned a bachelor's degree (or equivalent) from an accredited institution, and a Biology faculty member must have agreed to serve as major professor for that applicant. The Department of Biology also considers these guidelines for admission: (1) the transcript should show a minimum GPA of 3.0 (*B*); and (2) the scores on the verbal, quantitative, and analytical portions of the GRE should be above the 50th percentile. Advanced GREs (especially biology) are also recommended. Applicants for whom English is not the primary language must have scored at least 575 on the TOEFL. The applicant's undergraduate program should be similar to that offered by the Biology Department of Utah State University, which includes the following and their prerequisites: general biology, microbiology, genetics, ecology, physiology, cell biology, developmental biology, and evolution; general and organic chemistry; calculus; statistics; and physics. Other preparatory courses may be specified by the student's supervisory committee.

Course Requirements

Course requirements are determined by the student's supervisory committee. They will vary depending on the area of specialization selected and the background of the student.

Research

The Department of Biology provides a dynamic and broad base for research and graduate study through a balanced program of basic and applied studies at ecosystem, population, organismal, cellular, and molecular levels. An outstanding variety of field sites; animal, plant, and microbe growth facilities; and modern well-equipped laboratories are available. Also, the Intermountain Herbarium, an excellent insect collection, the USDA/ARS U.S. National Pollinating Insects Collection, a state-of-the-art electron microscope facility, a stable isotope laboratory, and the Biotechnology Center exist as research and support facilities.

Faculty members participate in and are supported by several interdepartmental programs, including: the Ecology Center, the Molecular Biology Program, and the Center for Environmental Toxicology. In addition, many less formal contacts and interactions exist with colleagues in the colleges of Agriculture, Natural Resources, and Science.

Students are encouraged to carefully consider how their career goals match the faculty's research interests. Prospective students are strongly encouraged to contact faculty members with whom they are interested in working. Because of the combination of a diverse interdisciplinary base and excellent focused research programs, students have an opportunity to learn the philosophies and methods of many branches of biology.

Financial Assistance

Research assistantships are available from the grants of major professors and from Utah Agricultural Experiment Station funds. Teaching assistantships are awarded annually. All awards are made on a competitive basis and specific teaching needs are considered in awarding teaching assistantships. Given satisfactory performance, MS students are supported for at least two years and PhD candidates for at least four years on teaching assistantships. The department may also recommend particularly qualified students for College of Science or University fellowships. Admission to the graduate program of the Biology Department does not guarantee financial support; however, applicants will not normally be admitted without financial support.

Career Opportunities

Completion of graduate degrees in Biology prepares students for careers in teaching and research in universities and colleges. Many graduates also find employment with private industry and state and national governmental agencies. Specific employment possibilities will depend on the nature of the graduate program pursued. The extensive background provided by a graduate degree also prepares students for eventual administrative responsibilities.

Degree Programs

For those who have demonstrated strong academic capability as well as research interest, the Department of Biology offers the **Master of Science Degree** or the **Doctor of Philosophy Degree** in Biology and Biology Ecology. A specialization in **Molecular Biology** is available for the Biology MS and PhD degrees. Graduate degrees in **Toxicology** are available through the Interdepartmental Program in Toxicology.

Undergraduate majors in Biology at USU with especially strong backgrounds and interest in research may apply for study of the Master of Science degree as **transitional students**. Acceptance as a transitional student allows undergraduates with advanced standing to integrate up to 9 credits of graduate work into the final semesters of their Bachelor of Science study. Acceptance into this program, as into all graduate programs in Biology, is closely regulated. Formal application through the School of Graduate Studies is required.

Research Emphases

Research areas of departmental faculty are diverse. Areas of research currently include: **Cellular and Molecular Biology:** plant-microbial interactions; molecular neurobiology and biophysics; gene regulation and signal transduction; membrane transport; molecular virology; autoimmune diseases; **Ecology and Behavior:** insect ecology and behavior; pollination biology; plant-insect interactions; vertebrate behavioral ecology; mathematical and computer modeling; community and restoration ecology; soil microbiology; fungal ecology; biological control; intetrated pest management (IPM); **Physiological and Developmental Biology:** toxicology and industrial hygiene; avian ecophysiology; insect toxicology and pathology; plant physiology, pathology, morphology, and anatomy; and **Systematics and Evolution:** systematics and evolution of plants, fungi, insects, reptiles, and amphibians; evolutionary quantitative genetics; biogeography; evolution of chemical defenses and resistance in microorganisms, insects, reptiles, and amphibians.

Research and Teaching Facilities

Herbarium. Graduate study in plant taxonomy offered in the

Department of Biology utilizes the extensive facilities of the Intermountain Herbarium. The collection includes over 220,000 research specimens. About 50 percent are from the Intermountain Region, while most of the remainder are from North America.

Insect Collection. Comprising over a million specimens, the insect collection is available to scientists and graduate students involved in taxonomic research and to those requiring identification of insects in various research projects. The collection primarily covers the Intermountain Region, but it also contains species from nearly all areas of the world. The BNR Building also houses the USDA/ARS U.S. National Pollinating Insect Collection.

Electron Microscopy Facility. A state-of-the-art teaching and research electron microscope laboratory is located in the VSB Building. This facility has four electron microscopes, with two for electron transmission microscopy, including a Zeiss CEM902 with electron energy loss elemental analysis capability. There are two scanning electron microscopes, including a Hitachi S4000 field emission SEM with analytical elemental analysis capability. In addition, a complete electron microscopy preparation laboratory is available.

Laser Scanning Confocal Microscope. The Biology Department has a BioRad 1024 Laser Scanning Confocal Microscope. This state-of-the-art technology utilizes highly tuned lasers to give detailed sectional views of the interior of intact structures such as cells and tissues, and greatly extends the advantages of fluorescence microscopy. This microscope is utilized by researchers campuswide, and is an indispensable tool for molecular and cellular studies.

Biotechnology Center. The Biotechnology Center operates three service laboratories and a variety of research projects. The service laboratories provide essential biological resources for biotechnology research and development including: DNA synthesis, peptide synthesis, protein sequencing, antibodies, and fermentation.

Biology Courses (Biol)

BLS 1010. Biology and the Citizen. Principles and methods of biology and how they impact the daily life and environment of the individual. (3F,Sp,Su) ©

1020. Biology and the Citizen Laboratory. Field and laboratory investigative exercises. Emphasizes observation, hypothesis formulation and testing, data analysis, and writing. (1F,Sp)

1110. Elementary Microbiology. Biology and role of microorganisms in the world around us, with emphasis on their contributions to human disease. Not intended for biology majors. (4F) ©

1210. Biology I. Principles of cell biology, energetics, and genetics. Plant structure, function, and development. (3F)

BLS 1220. Biology II. Animal structure, function, and development. Principles of evolution, ecology, and behavior. Prerequisite: Biol 1210. (3Sp)

1230. Biology I Laboratory. Biodiversity of microbes and plants, with observational and investigative laboratories. One lecture, one lab. Prerequisite: Biol 1210 (may be taken concurrently). (2F)

1240. Biology II Laboratory. Biodiversity of animals, with observational and investigative laboratories. One lecture, one lab. Prerequisite: Biol 1220 (may be taken concurrently). (2Sp)

2000. Human Physiology. Functioning of the human body, with emphasis upon major organ systems. Medical and athletic examples used to illustrate important concepts. (4F,Sp,Su) ©

2010. Human Anatomy. Study of the human body, with emphasis on the structure of each of the body's essential organ systems. Three lectures, one lab. (4Sp)

QI 2200. Principles of Genetics. Introduction to transmission, population, and molecular aspects of modern genetics. Prerequisites: Biol 1210, Chem 1220, and Math 1050. (4F,Sp)

2220. General Ecology. Study of the interrelationships among organisms and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. Prerequisites: Biol 1210 and 1220. (3F,Sp)

2400. Introductory Plant Taxonomy. Identification of vascular plants and recognition of families common in northern Utah. Prerequisite: Biol 1230. (3Sp)

2410. Field Botany. Introduction to identification of macrofungi and green plants. Quantitative methods for describing populations and communities. Prerequisite: Biol 1230. (3Su)

2700. Predental Orientation and Observation. Introduces predental students to the dental curriculum and characteristics of the dental profession. Each student assigned to a practicing dentist for part of the course. Prerequisite: Permission of adviser. (3F)

DSC, CI 3010. Evolution. Origins and evidence for the theory of biological evolution, and its significance for society and science. Prerequisite: University Studies Breadth Life Sciences course. (3Sp)

DSC 3020. Brain and Behavior. Introduction to human brain structure and function. Perspectives on development, normal function, aging, illness, diagnosis, and treatment will range from molecular to cellular to behavioral. Prerequisite: University Studies Breadth Life Sciences course. (3Sp)

DSC 3030. Genetics and Society. Course for nonscience majors. Addresses ethical, political, and social implications of advances in genetics. Basic genetic principles, as well as contemporary issues in human genetics. Prerequisite: University Studies Breadth Life Sciences course. Not open to biology majors or to those with credit in Biol 2200. (3Sp)

DSC 3040. Plants and Civilization. Examines the importance of plants as food, shelter, clothing, medicine, and drugs. Social and historical role of plants in aesthetics, religion, energy, biotechnology, human exploration, and migration. Prerequisite: University Studies Breadth Life Sciences course. (3F)

DSC 3050. Insect Biology. Examines life systems and anatomy of insects. Relationship of insects to other arthropods, society, and science. Two lectures, one lab. Prerequisite: University Studies Breadth Life Sciences course. (3F)

DSC 3060. Exploring Animal Behavior. In-depth investigation into four or five current topics in animal behavior. Students will generate hypotheses, and design and complete experiments to test them in field and laboratory settings. Two lectures, one lab. Prerequisite: University Studies Breadth Life Sciences course. (3Sp)

CI 3100. Bioethics. Discussion of current controversial ethical issues in medicine, animal rights, and environmental conservation. (3Sp)

QI 3220. Field Ecology. Field trips and exercises to study ecological patterns and processes in terrestrial and aquatic habitats. Emphasis on hypothesis testing and collection and analysis of data from the field. Prerequisites: Biol 2220 and Math 1210. Recommended: Course in statistics. (2F)

3300. General Microbiology. Biology, ecology, and diversity of microorganisms.

Emphasis placed on bacteria, viruses, fungi, and protists, and their role in the environment. Two lectures, two labs. Prerequisites: Biol 1210 (with a grade of *C*- or better); Chem 1120 or 2300 or 2310 (may be taken concurrently). (4F,Sp)

4000. Human Dissection. Exposure and dissection of the human body, with an emphasis on bones, joints, muscles, and internal organs. One evening lab per week. Prerequisite: Biol 2010. (1F)

4100. Genetics Laboratory. Experimental approach to genetics using bacteria, fungi, plants, insects, and humans. Students will be introduced to several computer and laboratory techniques, and will design many of the experiments. Prerequisite: Biol 2200. (2F)

4200. Cell and Developmental Biology. Advanced course emphasizing cellular structure and function relationships and examining regulation of tissue and organism development. Prerequisites: Biol 1220, 2200; Chem 2300 or 2320; Chem 3700 highly recommended. (4Sp)

QI 4230. Applied Mathematics in Biology. Formulation, analysis, and experimental tests of mathematical models in biology. Combines mathematics, computing, experimental design, and statistical analysis while applying the scientific method to biological systems. Lectures, recitations, and a laboratory. Prerequisites: Biol 1220, 1230, 1240; Math 2250; or permission of instructor. Programming recommended. (3Sp)

4250. Prehealth Internship/Co-op. Internship/cooperative work experience in prehealth biology to allow student to gain a professional level of experience. (2F,Sp,Su)

4710. Teaching Internship. A program in which advanced undergraduates function as teaching interns under the supervision of a faculty member. Prerequisite: Permission of department head. Not counted as Biology degree elective. Available only with pass/fail option. (1F,Sp,Su) ®

4750. Topics in Biology (Topic). (1-3F,Sp,Su) ®

4760. Independent Study. Directed individual or group study. Prerequisite: Biol 1220. Not counted as Biology degree elective. (1-3F,Sp,Su) ®

5050. Biophysics of Radiological Health. Brings together sciences relating to nuclear biophysics. Prepares students to be aware of radiological hazards, to safely use radioactive materials, and to comply with relevant laws. Prerequisites: Biol 1210, 1220, Chem 1210, 1220, a physics course, and senior standing. (3F,Sp)

5060. Principles of Electron Microscopy. Integrative course covering theoretical and applied principles of instruments and techniques necessary to perform biological electron microscopy. Prerequisite: Biol 4200. (3Sp)

5100 (d6100).[1] Neurobiology. Physiology, organization, and development of nervous systems. Examples taken from vertebrate and invertebrate systems. Special emphasis placed on cellular and molecular substrates of electrical excitability. Prerequisites: Biol 5500 and Phyx 2120. (3F)

****5150. Immunology.** Immune response in health and disease. Experimental approach to investigating immune function and abnormalities. Prerequisites: Biol 1220, 2200, 5510, or permission of instructor. (4F)

5160. Methods in Biotechnology: Cell Culture. Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. (3Sp)

5170 (d6170). Introduction to Population Genetics. Examines theoretical and applied aspects of how genes behave in natural and artificial populations of plants and animals. Genetic diversity, population structure, mating systems, selection, mutation, gene flow, genetic drift, molecular evolution, and quantitative genetics. Prerequisite: Biol 2200. (3Sp)

5190. Molecular Genetics. Molecular aspects of genetics, including DNA replication, structure, rearrangement, transposition, recombination, repair, genetic engineering, and gene expression. Prerequisites: Biol 2200 and Chem 3700. (3Sp)

QI 5200. Modeling Biological Systems. Basic techniques of mathematical and computer simulation applied to a wide variety of biological systems: ecology, physiology, agroecosystems, and cell biology. Model formulation, validation, sensitivity and stability analysis, stochastic systems. Prerequisites: Math 1220, Stat 3000, programming experience. (3F)

5240. Methods in Biotechnology: Protein Purification Techniques. Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: Chem 3700. (3Sp)

CI 5250. Evolutionary Biology. Current topics in organic evolution from molecular to macroevolutionary scales. Prerequisites: Biol 2200, 2220, or permission of instructor. (3F)

5260. Methods in Biotechnology: Molecular Cloning. Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: Chem 3700 or Biol 2200; or permission of instructor. (3F)

***5280 (d6280). Quantitative Genetics.** Theory and practice of the genetics of quantitative (continuously-varying) traits. Emphasizes intersection of quantitative genetics with issues in evolution, ecology, and conservation biology. Prerequisites: Biol 2200, Stat 3000. (3Sp)

5800. Undergraduate Research. Faculty directed research in biology. Prerequisites: Biol 1220 and consent of instructor. Maximum of 3 credits of Biol 5800 or 5810 are acceptable toward Biology degree requirements. (1-3F,Sp,Su) ®

5810. Bachelor's Thesis. Preparation of a written thesis, based upon individual investigation, under the supervision of faculty. Prerequisites: 3 credits of Biol 5800 (or concurrent enrollment) and consent of instructor. Maximum of 3 credits of Biol 5800 or 5810 are acceptable toward Biology degree elective requirements. (3F,Sp,Su)

6100 (d5100). Neurobiology. Physiology, organization, and development of nervous systems. Examples taken from vertebrate and invertebrate systems. Special emphasis placed on cellular and molecular substrates of electrical excitability. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: Biol 5500 and Phyx 2120. (3F)

6170 (d5170). Introduction to Population Genetics. Examines theoretical and applied aspects of how genes behave in natural and artificial populations of plants and animals. Genetic diversity, population structure, mating systems, selection, mutation, gene flow, genetic drift, molecular evolution, and quantitative genetics. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisite: Biol 2200. (3Sp)

6180. Molecular Population Genetics Laboratory. Application of molecular techniques to population genetics, ecology, and systematics. Includes experimental and sampling design, and data analysis. Prerequisite: Biol 5170/6170 or permission of instructor. (5F)

****6200. Biogeochemistry of Terrestrial Ecosystems.** Inputs, outputs, and cycling patterns of major nutrients. Emphasizes mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: Biol 1220, Soil 3000, Chem 2300 or 2310, or permission of instructor. (3F)

***6210. Advanced Cell Biology.** Presents most recent advances in cell biology research. Prerequisites: Biol 2200 and 4200. (3F)

***6260. Behavioral Ecology.** Focuses on current topics, emphasizing critical reading

and thinking skills. Includes lectures, student presentations, and discussions of primary literature. (3Sp)

****6270. Evolutionary Ecology.** Contemporary topics in evolutionary ecology with emphasis on life history evolution. Prerequisite: Biol 2220 or permission of instructor. (3Sp)

***6280 (d5280). Quantitative Genetics.** Theory and practice of the genetics of quantitative (continuously-varying) traits. Emphasizes intersection of quantitative genetics with issues in evolution, ecology, and conservation biology. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: Biol 2200, Stat 3000. (3Sp)

6290. Biophysics Radioisotope Tracer Methodology. Training for users of radioactive material. Instructor provides guidance and study at each student's lab on an individual basis. Prerequisites: Biol/Phyx 5050 and senior or graduate standing. (1-3F,Sp)

6750. Topics in Biology (Topic). (1-3F,Sp,Su) ®

6800. Biology Seminar. Format for general graduate-level seminar topics. (1F,Sp,Su) ®

6810. Microbiology Seminar. (1F,Sp,Su) ®

6820. Plant Biology/Pathology Seminar. (1F,Sp,Su) ®

6830. Entomology Seminar. (1F,Sp,Su) ®

6840. Zoology Seminar. (1F,Sp,Su) ®

6870. Ecology Seminar. The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. (1F) ®

6890. Molecular Biology Seminar. (1F,Sp,Su) ®

6910. Special Problems. Individual or group study under faculty guidance. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

6960. Graduate General Ecology. General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic enviroments. (5F)

6970. Thesis Research. (1-12F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7970. Dissertation Research. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

Botany Courses (Biol)

QI 4400. Plant Physiology. Introduction to plant metabolism, water relations, and growth. Prerequisites: Biol 1220, Math 1050. (4F)

4410. Plant Structure. Morphology, anatomy, and development of seed plants, with an emphasis on angiosperms. Two lectures, one recitation, and one lab. Prerequisites: Biol 1210, 1220, and 1230. (3Sp)

****5400. Advanced Plant Taxonomy.** Survey of vascular plant diversity presented in a phylogenetic and biogeographic context. Introduction to morphologically oriented research in plant taxonomy. Prerequisites: Biol 2400 and Stat 3000. (4F)

5410. Introduction to Plant Pathology. Combined lecture-lab course emphasizing concepts in plant pathology. Symptoms and disease-causing organisms are described. Methods of control, the nature of epidemics, and disease prediction. Prerequisites: Biol 1210, 1220; Biol 3300 recommended. (4F)

5420. Forest Pathology. Nature, cause, and management of forest diseases. (2Sp)

***5440 (d6440). Plant Molecular, Cellular, and Developmental Biology I.** Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. Prerequisites: Biol 2200, 4200; Chem 3700. (3Sp)

****5450 (d6450). Plant Molecular, Cellular, and Developmental Biology II.** Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from a research perspective. Prerequisites: Biol 2200, 4200, Chem 3700. (3Sp)

***6440 (d5440). Plant Molecular, Cellular, and Developmental Biology I.** Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: Biol 2200, 4200; Chem 3700. (3Sp)

****6450 (d5450). Plant Molecular, Cellular, and Developmental Biology II.** Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from research perspective. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: Biol 2200, 4200, Chem 3700. (3Sp)

Microbiology Courses (Biol)

QI 5300. Microbial Physiology. Lectures, discussions, and laboratory investigations concerning the physiology, structure, and metabolism of prokaryotic and eukaryotic microbes. Prerequisites: Biol 3300, Math 1210. (4Sp)

***5310. Soil Microbiology.** Ecology and diversity of microorganisms in soils. Emphasis on factors controlling microbial activity and the role of microorganisms in organic matter decomposition and nutrient cycling. Prerequisites: Biol 1210, 1220, 1230; Chem 2300 or 2310; Soil 3000. (3F)

***5320. Soil Microbiology Laboratory.** Techniques for measuring microbial activity and diversity in soils. Includes use of molecular and isotope methods. Prerequisite: Concurrent or prior enrollment in Biol/Soil 5310. (2F)

5330. Virology. Structure, replication, genetics, and molecular biology of viruses. Virus-host interactions. Viral diseases and antiviral agents. Prerequisites: Biol 2200 and 3300. (3Sp)

5340. Virology Laboratory. Introduction to laboratory techniques using bacterial and animal viruses. Prerequisite: Biol 5330 (may be taken concurrently). (2Sp)

****5350. Mycology.** Classification, ecology, genetics, and physiology of the fungi. Two lectures and one lab. Prerequisite: Biol 1220. (3F)

Public Health Courses (PubH)

3120. Family and Community Health. Focuses on health aspects of various population groups within the community. Particular emphasis placed on guidelines for optimal family health. (3Sp)

3310. Occupational Health and Safety. Covers the principles of occupational health and safety, including regulatory standards. Emphasizes on-the-job health and safety problems from the occupational health and safety professional and management view. Prerequisite: Chem 1220. (3F)

3610. Environmental Management. Introduction to environmental health, emphasizing relationships among environmental quality, public health, environmental and occupational health regulations, human health risk assessment, institutions, and engineered systems in environmental health management. Prerequisites: Chem 1210; Biol 1210 or University Studies Breadth Life Sciences course. (3F)

4000. Public Health Field Experience. Field experience in the practice of public health, as appropriate to each student's area of public health emphasis: public health education, environmental health, or industrial hygiene. Prerequisite: Junior standing in public health. (3-6F,Sp,Su) ®

4010. Special Problems in Public Health. Utilization of principles, tools, and techniques of public health in problem solving. Prerequisite: Junior standing in public health. (1-3F,Sp,Su) ®

5000. Public Health Seminar. Participant seminar on current problems in public health. (1F,Sp) ®

5010. Communicable Disease Control. Comprehensive study of communicable diseases, including etiological agents, reservoirs of infection, and mechanisms of transmission, control, and prevention. (3F) ©

5020. Fundamentals of Epidemiology. Introduction to the study of the distribution and causes of communicable and noncommunicable diseases of humans and other animals. Prerequisites: A course in statistics and PubH 5010. (3Sp) ©

5300. Industrial Hygiene Seminar. Participant seminar on current developments in industrial hygiene. (1F,Sp) ®

5310. Industrial Hygiene Chemical and Physical Hazards. Covers anticipation and recognition of chemical health hazards at work, personal protective equipment, and all aspects of physical health hazards, especially occupational noise. Prerequisite: PubH 3310 (may be taken concurrently). (4F)

5320. Industrial Hygiene Chemical Hazard Evaluation. Survey of principles and methods used to evaluate industrial chemical health hazards. Practical application in a field sampling project. Prerequisite: PubH 3310. (3Sp)

QI 5330. Industrial Hygiene Chemical Hazard Control. Covers methods to control chemical occupational health hazards, with an emphasis on the function, design, and management of local exhaust ventilation. Prerequisites: PubH 3310, Math 1210. (3F)

5350. Industrial Hygiene Field Experience. Field experience in the practice of industrial hygiene. Participation in an active program serving employees in either the private or public sector. Prerequisites: PubH 5310 and 5320. (3-6F,Sp,Su) ®

CI 5500. Public Health Management. Presentation of basic organizational and financial management tools, which students will utilize in written and oral reports on an educational, environmental, or occupational health problem of their choice. Prerequisite: Senior status in public health or consent of instructor. (2Sp)

Zoology Courses (Biol)

4500. Applied Entomology. Fundamentals of insect biology, emphasizing species of economic importance. Principles and tactics of pest management. Laboratory includes survey of beneficial and harmful insects affecting humans and agriculture. Prerequisites: Biol 1210 and 1220. (3Sp)

4510. Comparative Animal Physiology. Survey of physiological adaptations of animal organ systems (respiratory, excretory, circulatory, and integrative) to environmental variables. Not intended for students who have completed Biol 5500 or 5510. Prerequisites: Biol 1210, 1220. (3F)

5500. Vertebrate Physiology: Integration. Membrane physiology, body fluids, nervous system, muscles, and endocrinology. Emphasis on mammals. Prerequisites: Biol 4200 (may be taken concurrently); Chem 2300 or 2310; and Chem 3700. (3F)

5510. Vertebrate Physiology: Metabolism. Energy balance, digestion, respiration, circulation, osmoregulation, and immunology. Emphasis on mammals. Prerequisites: Biol 1220; Chem 2300 or 2310; Chem 3700; or consent of instructor. (3Sp)

QI 5520. Animal Physiology Laboratory. Principles of animal physiology examined by student-designed hypotheses, computer-assisted experimentation, data analysis using statistical methods, and formal data presentation. Prerequisites: Biol 4510 or 5500 or 5510 (may be taken concurrently); Stat 3000. (2Sp)

5530. Insect Systematics and Evolution. Evolution, biology, and classification of insects, including basic external morphology. Emphasizes role of phylogeny in systematics and importance of systematics in comparative biology. Prerequisites: Biol 1220 and 1240. (3F)

QI 5540. Invertebrate Physiology. Physiology of invertebrates relative to structure, function, ecological strategies, and evolutionary trajectories. Laboratory investigations exploiting invertebrate diversity. Prerequisites: Biol 1220, 1240; Math 1210. (4Sp)

5550. Freshwater Invertebrates. Taxonomy, ecology, and biology of major freshwater intertebrate taxa, including insects, crustaceans, molluscs, and oligochaetes. Several weekend field trips and a collection required. Prerequisite: One year of general biology or zoology, or permission of instructor. (3Sp)

****5560. Ornithology.** Surveys evolution, systematics, physiology, anatomy, ecology, behavior, and identification of birds. Includes lectures, laboratory and field exercises, field trips, and an independent project. Attendance required at one Saturday and one Friday-Sunday field trip. Prerequisites: Biol 1210, 1220; Math 1050. (3Sp)

5570. Herpetology. Evolution, adaptations, distribution, natural history, behavior, and identification of amphibians and reptiles of the world, with special emphasis on North American species. Two lectures and one lab. Prerequisites: Biol 1220, 1240. (3Sp)

5580. Mammalogy. Evolution, adaptations, distribution, natural history, behavior, and identification of mammals of the world, with special emphasis on North American species. Two lectures and one lab. Prerequisites: Biol 1220, 1240. (3F)

5590 (d6590). Animal Community Ecology. Concepts and controversies in modern community ecology emphasizing aquatic and terrestrial animals. Covers the community concept, diversity and stability, null models, relative importance of competition and predation, food webs, disturbance, metapopulations, biogeography, and new directions. Prerequisites: Biol 2220, Stat 3000. (4Sp)

****6510. Insect-Plant Interactions.** Ecology, evolution, and physiology of the interactions between insects and plants, including herbivory, defenses/compensations of plants to insect attack, pollination, and other mutualisms. (2F)

***6520. Ecological Vertebrate Physiology.** Physiological responses and adaptations of vertebrates to physical, chemical, and biological environments. Bioenergetics at the species level. Three lectures. Prerequisites: One course in physiology and one course in ecology. (3F)

6590 (d5590). Animal Community Ecology. Concepts and controversies in modern community ecology emphasizing aquatic and terrestrial animals. Covers the community concept, diversity and stability, null models, relative importance of competition and predation, food webs, disturbance, metapopulations, biogeography, and new directions. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: Biol 2220, Stat 3000. (4Sp)

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of

Business Administration

College of Business

Head: Professor *Philip R. Swensen*, finance
Office in Business 811, (435) 797-2362

Associate Dean for Business Graduate Studies: Professor *C. R. Michael Parent*, marketing research and strategy
Assistant Director: *Anita L. Lowe*
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Professors *Peter M. Ellis*, production and operations research; *Allen D. Kartchner*, production and operations research; *J. Robert Malko*, corporate and energy utility finance; *Paul A. Randle*, corporate finance and valuation analysis; **Associate Professors** *Kenneth R. Bartkus*, promotion management; *Drew Dahl*, financial institutions; *Cathy L. Hartman*, consumer behavior and environmental sustainability; *Alan A. Stephens*, corporate finance and investments; **Assistant Professors** *J. Brian Atwater*, production and quality; *Edwin R. Stafford*, marketing management, strategy, and environmental sustainability; *Lisa C. Troy*, marketing institutions and retailing strategy; **Lecturer** *Madeline S. Thimmes*, production and corporate finance

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Administration, Finance, Marketing, and Production Management. The Department of Business Administration participates in the College of Business MBA (Master of Business Administration) degree (see pages 130-131).

Undergraduate Programs

Objectives

The Department of Business Administration offers programs to prepare men and women for administrative position in business, government, and other institutions. Specialized training is provided within specific functional fields for business, as well as training directed at understanding the broader aspect of business as it functions within our free enterprise environment. Training is specifically provided in three areas: (1) **Finance**, leading to careers in banking, brokerage activities and investment, and positions as financial analysts in industry; (2) **Marketing**, involving positions in sales, advertising, retailing, distribution, and other similar activities; and (3) **Production Management**, leading to careers in manufacturing, including supply-chain management, production planning, quality management and project management.

College of Business Requirements

All students with majors in the Business Administration Department must satisfy the College of Business requirements, provided on pages 71-72. Academic advising about these requirements is available in the College of Business Student Service Center, Business 306.

Majors

Departmental Core. For all majors within the Department of Business Administration, students must complete the following courses: BA 3400, 3500, 3700; Econ 3400; MHR 3110, and MHR 4880 or 4890. In addition, students must complete at least one-half credit of BIS 3250. Students may take 3000-level courses before completing the College of Business prespecialization core; however, students will be restricted from enrolling in 4000-level courses until they have completed the prespecialization core and received advanced standing. See pages 71-72 for details.

Finance Major. Finance deals with planning the use of money, whether it is for the purchase of investment products, capital acquisitions, or for the day-to-day financial needs of a firm. In addition to completing the departmental core, students majoring in finance must take BA 4450, 4460; Econ 4010, 4020; and three finance electives. Students must choose two of the following: BA 4300, 4410, 4420, 4430. The third elective may be selected from the required finance electives or from BA 3080; Acct 3310, 3410, 5060, 5070, 5080; Econ 4030, 5030, 5330.

Marketing Major. Modern marketing consists of a system of activities designed to help the marketer understand and influence buyer and seller behavior. Within the socio-economic and political environment, the marketer must plan, price, promote, and distribute want-satisfying goods and services to society. The following courses, designed to prepare students in all areas of marketing, must be taken in addition to the departmental core: BA 4510, 4530, 4540, 4550, 4590. Because of prerequisite requirements, some of these courses will need to be taken during the junior year.

Production Management Major. Production management involves the planning, directing, and controlling of activities related to the production of goods and services. Required courses include: BA 3080, 4720, 4750, 4790, 5730, and two production electives. Production electives include: Acct 3310; BIS 3100; Econ 4010; Econ 5650 or 5670; MHR 3710, 4610.

Business Administration Major. A major in business administration is available for those students who have a special career objective that does not fit the other majors. A written proposal is designed by the student and submitted to the department head for approval. This proposal will include a written justification and a list of courses totaling at least 21 credits.

Instructions are available in the departmental office or from the departmental adviser.

Minors

The Department of Business Administration offers five minors. A grade point average of 2.50 in the five or six courses of a minor is required. Many of the courses listed under each minor have prerequisites.

Business Administration Minor for Non-Business Majors. BA 3400, 3500, 3700, and two of the following: BA 4450, 4460, 4510, 4540, 4550, 4720, and 5730.

Marketing Minor for Non-Business Majors. Acct 2010; MHR 3110; BA 3500, 4510, 4550; and either BA 4530 or 4540.

Marketing Minor. BA 3500, 3700, 4510, 4550; and either BA 4530 or 4540.

Finance Minor. BA 3400, 3500, 4450, 4460; and one of the following: BA 4300, 4410, 4420, 4430.

Production Minor. BA 3500, 3700, 4720; and two of the following: BA 3080, 4750, 4790, 5730.

Other Minors. The College of Business sponsors two minors, a general business minor and an international business minor. Information on these minors can be obtained from the College of Business Student Service Center, Business 306.

Other Degree Options

Dual Majors. Dual majors are available in accounting, human resources, management, business information systems, and economics. See the applicable department for information.

Second Bachelor's Degrees. Second bachelor's degrees are available for all four majors. For information, please contact the College of Business Student Service Center, Business 306.

Additional Information

Advising sheets for majors, minors, second bachelor's degrees, and the Business Administration major are available from the Department of Business Administration, Business 815, and from the College of Business Student Service Center, Business 306.

Graduate Programs

For information about the **Interdepartmental Curriculum for the Master of Business Administration (MBA)**, see pages 130-131. Master's degrees are also offered by the following departments in the College of Business: Accountancy, Business Information Systems and Education, and Economics. A Human Resources Management specialization is available in the interdepartmental Master of Social Sciences (MSS). For further information, refer to the appropriate sections of this catalog.

Business Administration Courses (BA)

1000. Business Orientation. Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (0.5F,Sp)

1350. Introduction to Business. Investigation of the role of business in contemporary society, including an introduction to the general problems of business operation. (3F,Sp) ©

2250. Introductory Internship. Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. (1-9F,Sp,Su) ®

QI 3080. Operations Research. Quantitative methods for resource allocation: linear programming, queuing theory, simulation, project management, etc. Prerequisites: Stat 2300 or 3000. (3F,Sp,Su)

3250. Discussions With Business Leaders. Students attend Partners in Business Program seminar sessions to examine new methods for improving performance in organizations. Repeatable to a maximum of 1.5 credits. (0.5F,Sp) ®

QI 3400. Corporate Finance. How corporations raise and manage capital. Study of modern financial principles, methods, policies, and institutions. Corporate organization, creation, and reorganization. Prerequisites: Math 1050; choose one statistics course from: Stat 1040, 2300, 3000, Psy 2800. (3F,Sp,Su) ©

3460. Fundamentals of Personal Investing. Examination of investment vehicles available to personal investor. Principal emphasis on corporate and government securities. Credit cannot be used toward requirements for finance major. (3)

3500. Fundamentals of Marketing. Overview of marketing function, emphasizing concepts and terminology. Includes basic marketing activities of product management, pricing, distribution, promotion, marketing research, and consumer behavior. (3F,Sp,Su) ©

3700. Production/Operations Management. Managerial aspects of production planning, procurement, inventory control, production control, quality control, layout, methods improvement, performances, standards, and basic industrial processes. Prerequisite: Stat 2300 or 3000. (3F,Sp,Su) ©

4250. Advanced Internship. Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. (1-9F,Sp,Su) ®

4300. International Finance. Overview of international financial management, including international financial markets, exchange rate behavior, and financing international trade. (3F,Sp)

4410. Financial Institutions. Role of domestic and international financial institutions in supplying services to consumers, businessmen, and government. Prerequisite: BA 3400. (3F,Sp)

4420. Insurance. Studied from the standpoint of insurance services consumers, course explores types of life, property, and casualty insurance contracts; nature and uses of life and property insurance; and the organization, management, and government supervision of insurance companies. Prerequisite: BA 3400. (3F)

4430. Real Estate Finance. Covers theory, principles, and techniques of real estate investment, emphasizing present value and cash-flow approaches to real estate investment decisions. Prerequisite: BA 3400. (3Sp)

4450. Financial Policy. Analyzes working capital management, capital budgeting,

capital management, and other short-term and long-term financial decisions. Prerequisite: BA 3400. (3F,Sp)

4460. Investments. Provides an understanding of security analysis and portfolio management. Market operations; risk and return; stock, bond, and option analysis; and portfolio theory and creation. Prerequisite: BA 3400. (3F,Sp)

4510. Buyer Behavior. Marketing analysis of the decision processes of individuals, households, businesses, and not-for-profit institutions. Builds on concepts from psychology, sociology, anthropology, and economics. Prerequisites: BA 3500; Psy 1010 or Soc 1010 or USU 1340. (3F,Sp) ©

4530. Marketing Research. Management of marketing research function. Basic vs. decisional research, survey research, cost vs. value of information, research design, experimentation, and analysis techniques. Prerequisites: BA 3500; choose one of the following statistics courses: Stat 1040, 2300, 3000, Psy 2800. (3F,Sp)

4540. Marketing Institutions. Examination of strategic decision-making by institutions involved in the marketing channel. Primary emphasis on retail institutions. Explores types of marketing intermediaries, vertical integration, channel member power and conflict, and international channel management issues. Prerequisite: BA 3500. (3F,Sp) ©

4550. Promotion Management. Examines role of promotion concepts in development of a communication strategy. Based on an introduction to the nature of communications, course covers advertising, personal selling, and sales promotion, emphasizing the competitive and strategic value of communications in both the marketplace and society. Prerequisite: BA 3500. (3F,Sp)

4590. Global Marketing Strategy. Analytical approach to strategic marketing problems facing the firm competing in global markets. Emphasizes key analytical and decision-making frameworks concerning the global marketing environment and the marketing mix and their impact on the firm's performance. Prerequisites: BA 4510, 4530, 4550. (3F,Sp)

4720. Production Planning and Control. Planning and control of production processes and materials flow. Prerequisite: BA 3700. (3F)

4750. Production Simulation. Computer simulation of production environment, including scheduling, routing, labor capacity, inventory, and delivery. Emphasizes just-in-time concepts. Prerequisite: BA 3700. (3Sp)

4790. Production/Operations Strategy. Role of production/operations in development of competitive advantage for a business firm. Prerequisite: BA 4720. (3Sp)

4800. Independent Research and Reading. (1-3) ®

4950H. Senior Honors Thesis/Project. Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (3Sp)

5730. Management of Quality. Develops methods and procedures for design, implementation, and control of total quality management programs in both product and service organizations. Prerequisites: BA 3700; Stat 2300 or 3000. (3F)

6160. Integrative Pre-MBA Core. Integrates financial reporting, analysis, and markets; domestic and global economic and legal environments; creation and distribution of goods and services; and human behavior in organizations. Upon completion, students without undergraduate degrees in business are prepared to enter advanced MBA core. (18Su)

6180. Intrasession MBA Workshop. Intensive workshops designed to enhance the MBA experience. (0.5-1) ®

6350. Managerial Economics. Application of concepts and theories, based on managerial economics, to business problems. Addresses cost theory, pricing, market structures, and forecasting. (3)

6420. Financial Problems. Corporate finance case course, dealing with problems in working capital management, capital budgeting, cost of capital problems, and corporate restructuring. (3F,Su)

6440. Financial Decision Making. Presentation of financial modelling techniques impacting firm decisions. (3Sp)

6520. Marketing Strategy. Advanced case approach to current marketing management problems. Emphasizes concepts, research, techniques, decision making, and marketing strategy development. (3Sp,Su)

6540. Special Topics in Marketing. Selected topics in marketing pursued in depth. Topics and instructors vary semester to semester. Prerequisite: BA 6520. (3Sp)

6560. Market Analysis and Decision Making. Develops skills necessary to plan and implement an effective marketing strategy. Focuses on role of marketing information in managerial decision making. Uses marketing cases and/or simulation games throughout the course. (3F,Sp)

6720. Operations Management. Study of basic process functions in managing a production or service organization, such as inventory control, production control, procurement, quality control, production planning, forecasting, etc. Prerequisite: First year core or BA 6160. (3F,Su)

6740. Decision Making in Operations Management. Selected topics in operations management pursued in depth. Topics and instructors vary from semester to semester. Prerequisite: BA 6720. (3Sp)

6860. Research in Business Decision Sciences. Requires students to develop and complete a research project based on principles of business decision science. (3F,Sp)

6900. Independent Research and Reading. (1-3F,Sp,Su) ®

6960. Professional Paper. A paper of professional quality prepared by each student. Designed to demonstrate the ability to complete a major business-related project and to effectively present the results. (3F,Sp,Su)

6970. Thesis. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Interdepartmental Curriculum for

Master of Business Administration (MBA)

Associate Dean for Business Graduate Studies: Professor C. R. Michael Parent
Assistant Director: *Anita L. Lowe*
Business Graduate Studies Office in Business 302, (435) 797-2360

FAX (435) 797-3995
E-mail mparent@b202.usu.edu
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Professors *Caryn L. Beck-Dudley*, business law and social responsibility; *Basudeb Biswas*, economics; *James W. Brackner*, accounting; *John R. Cragun*, organizational behavior and human resources; *Peter M. Ellis*, quantitative methods and production; *Gary B. Hansen*, manpower economics and industrial relations; *L. Dwight Israelsen*, economic theory; *I. Richard Johnson*, accounting; *Allen D. Kartchner*, quantitative methods and production; *W. Cris Lewis*, managerial economics; *J. Robert Malko*, finance; *Glenn M. McEvoy*, organizational behavior and human resources; *C. R. Michael Parent*, marketing; *Paul A. Randle*, finance; *Richard L. Ratliff*, accounting; *Clifford R. Skousen*, accounting; *David B. Stephens*, policy and labor relations; *Philip R. Swensen*, finance; **Associate Professors** *Kenneth R. Bartkus*, marketing; *David A. Baucus*, policy and strategy; *Melissa S. Baucus*, organizational behavior and strategy; *Gaylen N. Chandler*, human resources and entrepreneurship; *D. Richard Cutler*, statistics; *Drew Dahl*, finance; *David R. Daines*, business law and social responsibility; *Christopher Fawson*, economics; *Steven H. Hanks*, management and policy; *Cathy L. Hartman*, marketing; *Thomas S. E. Hilton*, information systems; *Richard L. Jenson*, accounting; *Ross E. Robson*, human resources and social responsibility; *Alan A. Stephens*, finance; **Assistant Professors** *J. Brian Atwater*, production and quality; *E. Vance Grange*, accounting; *Jeffrey J. Johnson*, information systems; *Edwin R. Stafford*, marketing; *Lisa C. Troy*, marketing; **Instructor** *Ralph L. Peck*, accounting; **Principal Lecturer** *Sharon Tarnutzer*, management and human resources; **Senior Lecturer** *Lawrence H. Siebers*, executive in residence, management, human resources

Degree Offered: Master of Business Administration (MBA)

Graduate Program

Objectives

The MBA program is an interdepartmental program administered by the College of Business. The MBA program is designed to provide understanding and analytical tools necessary for effective and efficient management in today's complex business world. The curriculum prepares students with a working knowledge of the fundamental business functions, and a sensitivity to the legal, ethical, social, technological, and international forces in the business environment. The MBA program is directed to develop the analytical, communication, interpersonal, and leadership skills needed for a successful career in a variety of organizations. The MBA program is accredited by AACSB, the International Association for Management Education.

Admission Requirements

For consideration for admission to the MBA program, applicants must submit all undergraduate transcripts, Graduate Management Admissions Test (GMAT) scores, and three letters of recommendation from qualified professionals, at least one of which must be academic. TOEFL scores are required for candidates from abroad, with a minimum of 550 deemed acceptable. International students with a prior degree from an English-speaking university are exempted from the TOEFL exam.

Applications are screened throughout the year by the MBA committee. No applications will be considered until all required information arrives in the School of Graduate Studies at Utah State University. In addition, the student desiring to pursue the MBA degree must have been accepted as a matriculated student before he or she will be permitted to register for 6000-level courses that will be part of the student's advanced program. Full-time business experience is also preferred. Personal interviews with faculty representatives are encouraged. Students who wish to be considered for financial aid must submit applications by **March 15** for the coming academic year.

Students with or without an undergraduate degree in business may enter the MBA program. However, before taking advanced core, specialization, or elective courses, basic competencies in business that have not been acquired through prior courses or experience must be developed by completing prerequisite courses as outlined in the MBA precore described below under *Degree Requirements.* Applicants not meeting minimum requirements may be allowed to correct deficiencies concurrently with graduate coursework. Before entering the program, each student should meet with an adviser to plan his or her course of study.

Degree Requirements

Precore. The MBA precore curriculum provides skills and knowledge in statistics, written communication, computer literacy, mathematics, information systems, economics, accounting, finance, marketing, management, and organizational behavior. Students who have completed a bachelor's degree at another university must have coursework equivalent to the core subject matter areas of the AACSB for direct entry into the advanced program.

Accelerated Precore. Students who have not completed a bachelor's degree accredited by the AACSB may choose to gain the necessary basic business competencies by attending the 18-credit Accelerated Precore (Acct, BA, BIS, Econ, or MHR 6160), which is offered during summer semester only. The accelerated precore is designed to prepare students with nonbusiness undergraduate degrees to enter the Advanced MBA core.

Alternatively, students may acquire the necessary basic competencies by completing courses satisfying the common body of knowledge requirement: Acct 2010; Acct 2020 or 6010; BA 3080 or 3700; BA 3400, 3500; BIS 2450; Econ 1500, 2010; MHR 2990; MHR 3110 or 6080; Math 1100; and Stat 2300. Students may not be required to take courses which duplicate prior academic or industrial training and are encouraged to meet with the director or assistant director of the MBA program to plan their course of study.

The advanced core and specializations consist of 30 credits. Students must complete the Advanced Core requirements listed below. In addition, students may choose to complete the course of study for a General MBA or select among several specializations, which are also described below. Finally, two additional credits of intrasession workshops are required for on-campus students.

Advanced Core (18 credits). Students must complete MHR 6890 to fulfill the integrative component of the advanced core. In addition, students must successfully complete any five of the following courses to fulfill advanced core requirements: Acct 6350; BA 6420, 6520, 6720; BIS 6440; Econ 6330; and MHR 6500. Students must complete either Econ 6330 or BIS 6440 to fulfill the quantitative methods requirements. (Stat 5100 may be used to fulfill the quantitative methods requirement with prior approval from the College of Business Graduate Programs Office). Courses taken as part of the advanced core cannot be counted towards specializations.

Course of Study for General MBA (12 credits). Working with the MBA director, students select a minimum of three electives (9 credits). One approved 5000-level course may be used. In addition, students must complete an approved College of Business graduate course (3 credits) which meets the Graduate School's research requirement. Electives taken outside of the College of Business may require the completion of prerequisite courses.

Specializations (12 credits)

Students may select a specialization in one of several areas listed below or an approved course of study to receive a general MBA. Courses taken as part of the MBA advanced core cannot be used as part of a specialization. One course in each specialization will be designated as research intensive to meet the University's research requirement.

Accounting. The accounting specialization consists of 12 credits of accounting courses, 9 of which must be numbered above 6010. The remaining 3 credits may come from any 5000- or 6000-numbered course, except Acct 6010. Acct 6610, or any 6960 course in the College of Business, must be taken to satisfy the Graduate School research requirement. Students with an undergraduate degree in accounting or equivalent must have completed coursework in corporate income tax (Acct 5410) and advanced accounting (Acct 5210 and 5220, or Acct 6040) either prior to or as part of the program of study. Students without undergraduate degrees in accounting may qualify for the accounting specialization in the MBA by completing the 18-credit accelerated precore and Acct 3110 and 3120. The 12 accounting credits required for the MBA-Accounting specialization are Acct 6020, 6030, 6040, and one additional accounting course above 6040. To qualify for this option, students must have a minimum GMAT score of 550 and score at least in the 40th percentile in each part of the GMAT examination.

Business Analysis and Decision Making. This specialization consists of BA 6440, 6540, 6740, and an approved elective which must satisfy the Graduate School's research requirement.

Business Information Systems. This specialization requires students to complete BIS 6700 and three of the following courses: BIS 6200, 6300, 6410, 6500, and 6750.

Entrepreneurship. This specialization consists of MHR 6410, 6430, 6470, and an approved elective.

Human Resource Management. This specialization requires students to complete MHR 6690 and to select any three of the following courses: MHR 6510, 6550, 6630, 6670, and 6760.

International Economics. This specialization consists of Econ 5150, 5400, 6910; and PolS 6220.

Manufacturing Management. This specialization includes BA 5730, 6740; and MHR 6350, 6370.

Quantitative Economic Analysis. This specialization consists of Econ 5310, 6330, 6910; and Stat 5100.

Intrasession Workshops (2 credits)

On-campus students must complete two credits of intrasession workshops from any 6180 course in the College of Business. These repeatable workshops are scheduled each semester and are designed to give students creative learning opportunities to enhance the MBA experience. Detailed descriptions of intrasession offerings for each semester are available in the MBA office.

Financial Assistance

Graduate assistantships, scholarships, and fellowships are available to outstanding students. Graduate assistantships and scholarships generally range between $1,000 and $3,000 for nine months. Application for assistantships must be made by **March 15.** A recipient of a graduate appointment is usually eligible for a waiver of the out-of-state portion of his or her tuition.

MBA Courses

For descriptions of MBA courses, see individual departmental course listings.

Department of

Business Information Systems and Education

College of Business

Head: Professor *Lloyd W. Bartholome*, business education, business communications
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Cooperative Education Supervisor: *Melissa H. Scheaffer*
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Microcomputer Laboratory Supervisor: *James N. Elwood*
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Professors *James Calvert Scott*, business education, business communications; *H. Robert Stocker*, business information systems; *William A. Stull*, marketing education; *John F. Vinsonhaler*, business information systems; **Professor Emeritus** *Charles M. Lutz*; **Associate Professors** *Dennis LaBonty*, business information systems; **Associate Professor Emeritus** *Floris S. Henderson*; **Assistant Professors** *Jeffrey J. Johnson*, business information systems; *David J. Paper*, business information systems; **Senior Lecturers** *Marianna Larsen*, office systems support, business communications; *Craig J. Peterson*, business information systems; **Lecturers** *Susan M. Jones*, business information systems, business communications; *Dana H. Swensen*, business information systems, business communications

Degrees offered: Associate of Applied Science (AAS) in Office Systems Support (two-year degree); Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Education; BS and BA in Marketing Education; BS and BA in Business Information Systems; Master of Science (MS) in Business Information Systems and Education; Master of Education (MEd) in Secondary Education with specialization in Business Education; participates in the Interdepartmental Doctor of Philosophy (PhD) in Education and Doctor of Education (EdD) with a specialization in Business Information Systems and Education

Undergraduate emphases: *Business Education BS, BA*–Business Teacher Certification, Training and Development; *Marketing Education BS, BA*–Marketing Teacher Education, Training and Development; *Business Information Systems BS, BA*–Information Systems Management, Office Systems Management. **Graduate specializations:** *MS*–Business Education, Business Information Systems, Information Systems Management, Marketing Education, and Training and Development

Distance Learning: The Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Information Systems are offered throughout the State of Utah through the USU satellite Distance Learning Program. The MS in Business Information Systems and Education is also offered through Distance Learning. For more information, contact the nearest USU Extension Center.

Undergraduate Programs

Objectives

The Department of Business Information Systems and Education offers two major educational thrusts in undergraduate as well as graduate programs. The Business Information Systems major is designed to prepare individuals for positions as managers in business information systems including information managers, information supervisors, network managers, systems analysts, applications programmers, systems trainers, and office systems managers by pursuing a bachelor's degree program in Business Information Systems.

The second major thrust is designed to prepare individuals as teachers and supervisors of business and marketing subjects at the secondary and postsecondary grade levels in the educational system or as teacher-trainers in private industry. Students may earn a bachelor's degree in Business Education or Marketing Education.

A comprehensive two-year Associate of Applied Science Degree in office systems support subjects is also available. In addition, the department provides service courses for many other groups of students.

The department has a modern microcomputer laboratory in seven separate rooms with more than 200 microcomputers. Students take microcomputer classes as part of their College of Business requirements, University Studies requirements, and elective programs.

Requirements

College of Business Requirements. All bachelor's degree students majoring in Business Information Systems and Education programs must satisfy the College of Business entrance requirements provided on pages 71-72. Academic advising about these requirements is provided by the College of Business Student Service Center, Business 306. Business Information Systems majors must also follow College of Business prespecialization requirements for advanced standing, detailed on pages 71-72. Prespecialization requirements for Business Education and Marketing Education majors are as follows: Acct 2010, 2020; BIS 1000, 2450, 2550; Econ 1500, 2010; MHR 2990; and Psy 1010.

Teacher Certification. Persons planning to teach must also be admitted to the teacher certification program in the College of Education. A cumulative college grade point average of 2.75 is required to be admitted to the College of Education, to student teach, and to graduate in Business Education or Marketing Education with a teaching certificate. Detailed information may be obtained from the Department of Secondary Education and/or the College of Education.

Two-year Associate of Applied Science Degree. Students indicating an interest in the Office Systems Support Associate of Applied Science Degree can be accepted directly into the program upon admission to the University. Students who desire to transfer to a four-year program offered by the College of Business must meet the requirements specified for bachelor's degree programs.

Competency-based Placement Program. Students who have acquired knowledge and skills that are not represented on their collegiate transcripts of credit are allowed to demonstrate competency by challenging related courses. Placement in a skills-oriented sequence can be accomplished by discussion with an adviser. Challenge of courses is done by successfully completing an examination similar to a final course test.

Students with potential for demonstrating competence have two options, one of which must be chosen prior to examination. One option is to challenge for credit (*P/D+, D, F* option) according to University established procedures; results of the test are recorded on the student's transcript. There is a fee for this option. A second option is to waive without credit required classes, if competence at the *B* level is demonstrated.

Program Requirements

Bachelor's Degree in Business Information Systems. The Information Systems program at Utah State University offers a common core of courses through two departmental majors: Business Information Systems and Education; and Computer Science. The curricula of the individual departments differ *substantially* in emphasis.

The **Business Information Systems major, Information Systems Management emphasis,** is offered in the Business Information Systems and Education Department, College of Business. The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, network managers, applications programmers, and information systems managers in business and industry. BIS majors take required courses in analysis and design, Internet management, telecommunications, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a Master of Science in Business Information Systems and Education with an area of emphasis in Information Systems Management.

The **Computer Science major with an Information Systems option** is located in the College of Science and is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this option are trained in all phases of the analysis, design, and implementation of Information Systems. As part of this option, students also receive training in the theory and application of information with courses in telecommunications and expert systems. Students select an application area such as business, accounting, or economics. Other application areas can be developed by working closely with an adviser. This program of study leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science. See pages 166-167 for additional details.

General requirements for all Business Information Systems majors are: Acct 2010, 2020; BA 3400, 3500, 3700; BIS 1000, 1400, 2300, 2450, 2550, 3100, 3250, 3500, 4250, 5700; Econ 1500, 2010, 3400; MHR 2990, 3110; MHR 4880 or 4890; Math 1050, 1100; Stat 2300; Psy 1010 or Soc 1010; and University Studies (General Education) requirements.

Students must choose either an information systems management emphasis or an office systems management emphasis.

The **information systems management** emphasis provides knowledge and skills for business systems analysts, applications programmers, information managers, and other business information systems positions.

Required classes for the information systems management emphasis are: BIS 3330, 4100, 5100, 5200, 5300; CS 1700, 3510; plus 7 credits outside the College of Business related to the major. It is strongly recommended that students take BIS 5050 and 5450. See adviser for current checklist of requirements.

The **office systems management** emphasis provides knowledge and skills for office managers, administrative assistants, and other practitioners who assist with analysis, design, and use of computerized information from a user's perspective.

Required classes for the office systems management emphasis are: BIS 2400, 2520, 2600, and 5450, plus 13 credits of approved upper-division classes outside the College of Business related to the major. BIS 3330, 5200, and 5300 are strongly recommended. See adviser for current checklist of requirements.

Bachelor's Degree in Business Education. A composite major in Business Education is designed for students desiring to qualify for a certificate to teach business subjects in grades 7-12 or to teach in business and industry. Required courses include: Acct 2010, 2020; BA 3500; BIS 1000, 1400; BIS 2250 or 4250; BIS 2300, 2400, 2450, 2520, 2550, 3100, 3140, 4550, 5200, 5300; Econ 1500, 2010; MHR 2990, 3110; Psy 1010; and other University Studies courses required by the University. Required English classes are Engl 1010 and 2010. Students must also complete at least one of the following options:

1. Teacher Certification Option: BIS 3000, 3300, 3400, 4300, 4400, 5500, 5600; InsT 3000; ScEd 3100, 3200, 4100, 4200, 5100, 5200, 5300; SpEd 4000.

2. Training and Development Option: BIS 4250, 4350, 5450; InsT 6280; and 12 additional credits of Training and

Development courses. Suggested electives include: MHR 3710, 4610; InsT 5210, 5220, 5230, 5300.

Those who do not wish to certify to teach in the public schools may select an emphasis in Training and Development for business and industry.

Bachelor's Degree in Marketing Education. A composite major in marketing education is designed for students desiring to qualify for a certificate to teach marketing and distributive education subjects in the public secondary schools or in business and industry. Required courses for students wishing to certify to teach include: Acct 2010, 2020; BA 3500, 4510, 4540, 4550; BIS 1000, 1400, 1420, 2250, 2300, 2450, 2550, 3140, 3550, 4550; Econ 1500, 2010; MHR 2990, 3710; Psy 1010. Students must also complete at least one of the following options:

1. Teacher Certification Option: BIS 3000, 3300, 3400, 4300, 4400, 5500, 5600; InsT 3000; ScEd 3100, 3200, 4100, 4200, 5100, 5200, 5300; and SpEd 4000.

2. Training and Development Option: BIS 4250, 4350, 5450; InsT 6280; and 12 additional credits of Training and Development courses. Students are encouraged to take InsT 5210, 5220, 5230, 5300; and MHR 4610.

Those who do not wish to certify to teach in the public schools may substitute an option in Training and Development for business and industry.

Students must also complete Engl 1010 and 2010, as well as Econ 1500 and BIS 3140, which may be counted toward their University Studies (General Education) requirements.

Graduation Requirements. To be recommended by the department for graduation with a bachelor's degree, BISE majors must have a minimum GPA of 2.5 in courses required for their major. Business Information Systems majors must have an overall GPA of 2.5. Business and Marketing Education majors must have an overall GPA of 2.75. This includes transfer credit. The College of Business requires that at least 60 semester credits be taken in courses taught outside the College of Business. Up to 9 semester credits of economics and 6 semester credits of statistics can be considered as courses taught outside the College of Business. At least 50 percent of the business credits required for a business degree must be taken on the Utah State University campus or at a designated residence center.

Communications Literacy requirements are Engl 1010 and 2010 plus two Communications Intensive courses.

Office Systems Support Associate of Applied Science Degree. This program is designed for students desiring two years (a minimum of 65 semester credits) of college to prepare for positions as office supervisors and other office and information systems support personnel. Emphasis is placed on job skills. Requirements are: Acct 2010; BIS 1000, 1400, 1420, 1550, 2250, 2300, 2400, 2450, 2520, 2550, 2600. In addition, students are required to complete a minimum of 9 credits in business-related areas as approved by their adviser.

A minimum of 18 credits of University Studies must be taken. Required University Studies classes are: 6 credits of communications literacy (Engl 1010 and 2010), 3 credits of quantitative literacy (Math 1050 or 1100), and 9 credits of breadth requirements.

Students who initially enroll for the two-year Associate of Applied Science Degree may readily change to a four-year bachelor's degree program and complete the requirements for the business information systems major, business education major, or another major in the College of Business.

Minors. The Department of Business Information Systems and Education is authorized to award teaching minors in Business Education, Marketing Education, and Business Computers and Information Systems. A minor in Business Information Systems is also authorized.

Requirements for the *Business Education teaching minor* are Acct 2010; BIS 1400, 2300, 2400, 2450, 2520, 3000, 3140, 3300, 3400, 4300, 4400, 5200, 5300; Econ 1500; and MHR 2990.

A *teaching minor in Marketing Education* consists of the following courses: Acct 2010; BA 3500; BIS 1400, 2300, 2520, 3000, 3140, 3300, 3400, 3550, 4300, 4400; Econ 1500; MHR 2990, 3110, 3710.

Requirements for the *Business Computer and Information Systems teaching minor* are: Acct 2010; BIS 1400, 1420, 2300, 2400, 2450, 3000, 3100, 3300, 3400, 3500, 5200, 5300; CS 3500.

The minors listed above are **teaching minors** and are available only to those working towards a teaching certificate.

Students wishing to *minor in Business Information Systems* must complete the following courses: Acct 4500; BIS 2300, 2450, 3100, 3330, 3500; CS 1700 or 3510. In addition, they must choose one course from the following: BIS 4100, 5150, 5200, 5410, 5700; CS 1700 (if not taken in *required* section) or 3510. The following courses are also required for nonbusiness majors: Acct 2010, 2020; BIS 1400.

Student Organizations

The Department of Business Information Systems and Education sponsors or co-sponsors four student organizations. Each group provides unique experiences that can complement and enrich formal coursework. Leadership development and human relations skills are among the personal attributes enhanced by involvement in the various organization activities.

Association for Computing Machinery (ACM). ACM, a professional society for the information systems industry, sponsors a student chapter at USU. The goals of ACM are to: (1) provide leadership experiences for undergraduate and graduate business information systems majors; (2) help student members plan their careers and find employment by introducing them to practicing systems professionals; and (3) foster a professional attitude among business information systems majors so that they will contribute to their field.

Phi Beta Lambda (PBL) is a cocurricular student organization. The organization's goal is to provide opportunities to develop business career competencies and to promote civic and personal responsibility. Membership is open to all students interested in business.

Delta Epsilon Chi (DEX) is a cocurricular organization designed for marketing education and marketing majors. The major goal of DEX is to help students prepare for careers in marketing or marketing education. DEX provides students with opportunities to compete in marketing events at the state and

national levels. Membership is open to all students interested in business and marketing.

Delta Pi Epsilon (DPE) is a national honorary fraternity for graduate students. Purposes of the organization include enhancement of research, scholarship, service, and cooperation in the profession. Election to membership requires review by members and faculty of the Department of Business Information Systems and Education.

Graduate Programs

Master of Science

Students applying for admission to the Master of Science program in Business Information Systems and Education must take the GMAT test. A score at the 40th percentile or better on the GMAT is required for admission. Undergraduate GPA should be 3.0 or above. Meeting minimum requirements does not guarantee admission.

The MS requires a minimum of 33 credits. A minimum of 24 credits of academic work must be in classes numbered 6000 and above. Twelve or more credits should be in the area of specialization. Students with bachelor's degrees outside of business may be required to complete additional coursework.

Students in the master's program pursue the *Plan C* option, where a research paper is completed in a special research class. Those who wish to pursue the *Plan A* thesis option must have permission from their committee to do so.

All MS degrees in the BISE Department require the following core: BIS 6150, 6440, 6700, 6810.

The specialization in **Information Systems Management** is for students who wish to work as systems analysts, application programmers, network managers, information managers, information center managers, and trainers in business information systems.

Students are expected to have a background in business information systems. Required courses are BIS 6120, 6200, 6300, and BIS 6410 *or* 6750, in addition to the departmental core. Students who choose the Plan A option must complete 6 credits of BIS 6970. Students may take credits in Business Information Systems and Education, Computer Science, Instructional Technology, Business Administration, Accounting, Economics, or other approved electives.

The specializations in **Business Education, Marketing Education,** and **Training and Development** are designed for those who are teaching in an area of business or who wish to work in training and development in business and industry. Required courses are BIS 6350, 6450, 6720, and *either* Graduate Internship (BIS 6250 or 6600) *or* BIS 6550. Students may take elective courses from the departments of Business Information Systems and Education, Computer Science, Instructional Technology, Business Administration, Communication, Economics, Secondary Education, and Psychology, or may select other approved electives.

The USU MS in Business Information Systems and Education is the **only** master's program in Business Information Systems in the state of Utah. Graduates are placed in the West and throughout the nation.

Master of Education

Students desiring admission to the MEd program must also meet the requirements of the Secondary Education Department.

The MEd degree in secondary education with specialization in business education has a master's project requirement as part of the program. The program is devised specifically for the practicing secondary school teacher of business or marketing education. Students complete a core area in secondary education, as well as requirements in business education and subject-matter-oriented courses. The program is also designed to prepare people to teach in public secondary schools.

Doctor of Philosophy and Doctor of Education

Applicants for admission to the College of Education PhD or EdD programs with a specialization in Business Information Systems and Education must take the GRE. Scores on the verbal and quantitative test must be at or above the 40th percentile. No minimum score is required on the analytical section (required by the Educational Testing Service).

The Department of Business Information Systems and Education cooperates with other departments in offering the interdepartmental Doctor of Philosophy (PhD) and Doctor of Education (EdD). Within the Business Information Systems and Education specialization, emphases can be pursued in business education, marketing education, business information systems, and business communications. Other subject-matter emphases are also available. The PhD is a research-based degree. The EdD degree is a practitioner's degree. Both degrees require dissertations. Graduates secure positions teaching business subjects or business-teacher education in colleges and universities or in business and industry. Former graduates are currently in various positions in higher education, including higher education administration; in teacher education instruction; and in business and industry.

Additional Information

Specific details about each of the foregoing degree programs are outlined in policy and procedure documents available through the department. All requirements are subject to change; check with the department for current requirements.

The business and marketing teacher education programs, at the undergraduate and graduate levels, are ranked highly and respected throughout the nation, with faculty who are nationally and internationally recognized.

All students must meet admission requirements as specified by the School of Graduate Studies (see pages 60-61).

Research

Faculty in the Department of Business Information Systems and Education are active in research and scholarly endeavors. Current and published research topics include business communications; international communications; improvement of

instruction in teaching; business information systems as related to business and industry; curriculum for business schools; business reengineering; group decision support systems; microcomputer applications; use of microcomputers in various subjects, including accounting and business communications; cooperative education; issues in higher education; and other areas related to business information systems, marketing education, and business education.

Financial Assistance and Assistantships

Funds for scholarships are provided through the School of Graduate Studies and administered in the department. Those interested in scholarships should contact the graduate director or the department head.

Each year several high-quality graduate teaching assistants are needed. These assistants generally teach classes in keyboarding, word processing, business communications, and microcomputer applications. Those who are interested in teaching assistantships must apply through the department head. They must have had teaching experience or be willing to take teaching methods classes, as well as the School of Graduate Studies-sponsored teaching assistant workshop, prior to receiving an assistantship.

Career Opportunities

Business Information Systems is one of the fastest growing fields in business and industry. Follow-up studies show that information systems positions pay excellent salaries, and the placement rate of students is almost 100 percent. Currently, there is also a great demand for business teachers in public education.

Business Information Systems and Education Courses (BIS)

1000. Business Orientation. Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (0.5F,Sp)

1110. Keyboarding. For students with no previous keyboarding experience. Designed so student can touch type and learn basic concepts related to word processing and document formatting. (2F,Sp,Su)

1400. Microcomputer Applications in Business. Using microcomputers at school and work. How to operate a PC. Includes operating systems, word processing, Internet, graphics, database, and spreadsheet applications. Includes preparation for University Studies Computer and Information Literacy examination. Prerequisite: Ability to keyboard at a minimum of 25 wpm. (3F,Sp,Su)

1410. Special Topics. Selected topics related to using computers in business. (1-3F,Sp,Su) ®

1420. Word Processing Applications. Word processing software instruction designed for office applications. Emphasizes creating business documents and improving keyboarding skills. Assumes ability to keyboard by touch at a minimum of 50 wpm. (3F,Sp,Su)

CI 1550. Business Correspondence. Development and application of effective business writing skills, emphasizing business correspondence. Includes thorough review of grammar, spelling, and punctuation related to business correspondence. (3F)

2250. Introductory Internship. Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. (1-9F,Sp,Su) ®

2300. Business Data Communications and Networking. Emphasizes business data communications in a LAN and WAN networking environment. Includes network protocols, cable technology, telecommunications standards, security issues, and general telecommunications management issues. Prerequisite: BIS 1400. (3F,Sp,Su)

2400. Desktop Publishing of Business Documents. Design, development, and evaluation of business documents, using the technology of desktop publishing. Prerequisite: BIS 1400. (2F,Sp,Su)

2450. Spreadsheets and Databases for Business. Concepts related to integration of microcomputer spreadsheets and databases into business. Use of spreadsheets and databases to accomplish business operations. Prerequisite: Computer competency exam or equivalent. (3F,Sp,Su)

2520. Integrating Office Technology. Advanced applications of office technology for production of business documents, emphasizing efficient use of word processing, graphics, and desktop publishing. Prerequisites: BIS 1420, 2550. (3F,Sp)

CI 2550. Business Communication. Development and application of effective oral and written business communication skills. Language/mechanics, grammar, and document formatting. Prerequisites: Engl 1010, 2010. (3F,Sp,Su)

2600. Office Procedures. Finishing course which integrates office knowledge and skills. Applies administrative activities which are part of the office process. Prerequisites: BIS 2520; BIS 1550 or 2550. (3F,Sp)

3000. Principles of Business and Marketing Education. Covers principles of business and marketing education, including professionalism, historical overview of the field, student organizations, advisory committees, applied technology education, and school-to-careers program. (1F)

DSS 3100. Business Information Systems. Survey of business uses of information technology, emphasizing vocabulary, concepts, career options, and systems components. Includes general systems theory and business functional information subsystems (e.g., accounting, management, finance, and marketing). (3F,Sp,Su)

QI 3140. Managing Personal Finances. Management of personal business affairs, including insurance, investments, installment buying, and estate planning. Emphasizes personal business affairs as related to economic developments in the public and private sectors. Prerequisite: Math 1030 or Math 1050 or Stat 1040. (3Sp)

3250. Discussions With Business Leaders. Students attend Partners in Business Program seminar sessions to examine new methods for improving performance in organizations. Repeatable to a maximum of 1.5 credits. (0.5F,Sp) ®

3300. Clinical Experience I. First business/marketing clinical practicum (40 hours minimum) in middle and secondary schools; must be taken concurrently with BIS 3400 methods class. Required at Level I. Prerequisite: Program admission. (1F)

3330. Database Management. Theory and application of designing, developing, and maintaining database systems. Principles of management of data resources to support effective information systems in organizations. Prerequisites: BIS 3100 and one programming language. (3F,Sp)

3400. Methods of Teaching Keyboarding and Microcomputing. Psychological principles and methodology for teaching keyboarding, word processing, microcomputing, and accounting. Includes equipment and laboratory needs, classroom management, and lesson planning. Prerequisites: BIS 2520, Acct 2010. (3F)

3500. Integrated Projects Using Visual Basic. Creation of applications to solve typical business problems or support common functions, such as inventory control, accounts receivable, or personnel management. Students create working systems using widely-used Windows software. Prerequisite: BIS 2450. (3F,Sp,Su)

3550. Principles of Selling. Focuses on the sales process, including prospecting, qualifying customers, planning and delivering the sales presentation, overcoming

objections, closing the sale, and satisfying the customer's needs. (2Sp) ©

4100. Systems Analysis and Design. Business information systems analysis and design methods for solving business problems, emphasizing SDLC, prototyping, and case technology. Prerequisites: BIS 3330 and 3500. (3F,Sp)

4250. Advanced Internship. Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. (1-9F,Sp,Su) ®

4300. Clinical Experience II. Second business/marketing clinical practicum (40 hours minimum) in middle and secondary schools; must be taken concurrently with BIS 4400 methods class. Required at Level 2. Prerequisites: Program admission and completion of Level 1. (1Sp)

4350. Introduction to Training and Development. Introductory course in training and development. Examines various roles of the human resource manager in the training domain. Students learn systems approach to developing and implementing training programs in business. (3Sp)

4400. Business Education and Marketing Education Methods. Instructional methods for conceptual business and marketing classes. Includes methods for advising student organizations, school to careers programs, and relationships between general and applied technology education. Prerequisites: Econ 1500, MHR 2990, BIS 3140, 3550. (3Sp)

CI 4550. International Business Communication. Culture-general and culture-specific study of business communication in the diverse world of international business from both theoretical and applied perspectives. (3Sp)

4950H. Senior Honors Thesis/Project. Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (3Sp)

5050. Advanced Projects with Visual Basic. Developing business information systems applications using Visual Basic, Access, Excel, and other office professional software. Prerequisites: BIS 3330, 3500. (3Sp)

5100. Systems Design and Implementation. Management, evaluation, documentation, maintenance, and reengineering of business information systems projects. Prerequisite: BIS 4100. (3F,Sp)

5150. Management Support Systems. Survey of information technology to support management activities, including decision support systems, executive information systems, group support systems, electronic meeting systems, and expert systems. Prerequisite: BIS 3100. (3Sp)

5200. Local Area Network Management for Business. Application of networking concepts related to the management of local area networks. Includes topics related to setup, management, and maintenance of local area networks and installation of electronic mail handling systems. Prerequisites: BIS 2300, 2450, and 3100. (3F,Sp)

5300. Internet Management for Business. Installation and setup of software to utilize Internet/Intranet services. Services covered include: e-mail, ftp, telnet, world wide web, security, and Usenet News. Prerequisites: BIS 2300 and 5200. (3F,Sp,Su)

5410. Managing Information Technologies. Study of current technologies which impact upon managing and communicating business information. Participants will learn about equipment, methods, and management skills promoting a productive business environment. (3Sp)

5450 (d6450).[1] Computerized Business Presentations. Designed to utilize computerized business presentation capabilities. Participants will use computers to generate and deliver effective presentations integrating presentation software and oral communication skills. Prerequisite: BIS 2450. (3Sp,Su)

5500. Business/Marketing Teaching Seminar. Capstone seminar focused upon student business teaching issues, professional development, and principles of effective instruction, emphasizing reflective teaching. Must be taken concurrently with BIS 5600. Prerequisites: Level 1 and Level 2 completion; student teaching placement. (2F)

5600. Business/Marketing Student Teaching. A 10-week culminating student teaching experience in which students assume full-time teaching responsibilities under the direction of cooperating teachers in major and minor fields. Must be taken concurrently with BIS 5500. Prerequisites: Level 1 and Level 2 completion; student teaching placement. (8F)

5660 (d6660). The Adult Business Learner. Focuses on the adult business learner, the concept of the "learning organization," and the different types of postsecondary institutions that provide adult training and education in business. (3F)

DSS 5700. Managing Global Information Systems. Management issues inherent in the global information systems function. Introduces current technologies which impact upon managing global information. Participants learn about equipment, applications, and management skills which lead to increased productivity. (3Sp)

5950. Independent Readings. Designed for individual student projects as approved by the department. (1-5F,Sp,Su) ®

6110. Workshop. Intensive workshops. (1-3F,Sp,Su) ®

6120. Business Information Systems Development. Business information systems development, including analysis, design, and implementation. Students develop a working prototype to solve a real-world information systems problem. (3Sp)

6150. Communication for Business. In-depth study of the process for preparing written business communications and related oral presentations. Preparation of reports relevant to student's major. Prerequisite: BIS 2550 or equivalent. (3F,Su)

6160. Integrative Pre-MBA Core. Integrates financial reporting, analysis, and markets; domestic and global economic and legal environments; creation and distribution of goods and services; and human behavior in organizations. Upon completion, students without undergraduate degrees in business are prepared to enter advanced MBA core. (18Su)

6180. Intrasession MBA Workshop. Intensive workshops designed to enhance the MBA experience. (0.5-1) ®

6200. Business Data Communication Systems. Introduction to business data communications, including concepts, network architecture, data communication software and hardware, distributed information systems, and business communication system services. (3F)

6250. Graduate Internship. Graduate-level internship in business, industry, or government position approved by department. Requires written learning objectives, performance evaluation, and a final internship written report. Requires 75 hours internship per 1 semester credit. (1-6F,Sp,Su) ®

6300. Database Management Systems. Theory and application of database technology in business systems. Database vocabulary and concepts. Design, development, and evaluation of databases and applications. Management of database systems. Emerging database technologies. (3Sp)

6350. Managing Business Training Programs. Examines various management topics in the training and development field, including program development, implementation, and evaluation. Discusses the various roles of training program managers. (3F,Su)

6410. Human-Computer Interface Design. Integrates aspects of industrial psychology, work physiology, human environments, job analysis, and hardware/software engineering in the study of designing effective, efficient input/output interfaces for business information systems. (3Sp)

6440. Information and Decision Making. Case-based approach to learning role of information technology when making quantitative and qualitative analyses, including statistical techniques to solve business problems through the use of information technology. Prerequisite: At least one graduate or undergraduate class in statistics. (3Sp)

6450 (d5450). Computerized Business Presentations. Designed to utilize computerized business presentation capabilities. Participants will use computers to generate and deliver effective presentations integrating presentation software and oral communication skills. Prerequisite: BIS 2450. (3Sp,Su)

6500. Developing Business Information Systems with Advanced Software Concepts. Creation of custom applications to solve typical business problems or support common functions, using Visual Basic programming and OLE Automation with MS Office software. Prerequisite: Knowledge of database and spreadsheet software. (3F,Sp,Su)

6550. International Business Communication. Culture-general and culture-specific study of business communication in the diverse world of international business, from both theoretical and applied perspectives. (3F)

6600. Business Teaching Internship. Graduate-level business teaching experience at approved corporate, secondary, or post-secondary sites. (1-3F,Sp,Su) ®

6660 (d5660). The Adult Business Learner. Focuses on the adult business learner, the concept of the "learning organization," and the different types of postsecondary institutions that provide adult training and education in business. (3F)

6700. Global Information Systems Management. Prepares managers and users of business information systems in a global environment. Emphasizes management functions and problem solving using computerized information systems in a global business. (3F,Su)

6720. Instruction and Training in Business and Marketing Education. Designed for experienced training and educational personnel. Focuses on ways to improve instructional techniques and approaches. Compares traditional teacher/trainer-style teaching to student-centered teaching and training. (3Su)

6730. Teaching Methods in Business Education, Marketing Education, and Information Systems. Advanced methodology for teaching business, marketing, and information system subjects, including techniques for teaching word processing, keyboarding, Internet, basic business, accounting, marketing, economics, and other business subjects in cognitive, psychomotor, and affective instructional domains. (3Su)

6750. Business Process Reengineering Using Information Technology. Examines methodologies and state-of-the-art thinking in the area of business process reengineering. Designed to help students understand how organizations manage change in contemporary global business environments by utilizing the latest information systems and technology techniques. (3Sp)

6760. The Administration and Organization of School-to-Careers Programs in Business. Covers the philosophy of the school-to-careers movement in the U.S., as well as how to organize and administer such a program. Includes discussion of the school-based, linking, and work-based components of such a program. (3Su)

6770. Competency-based Instruction. Business teachers learn how to develop competency-based instruction by completing a CBI project. (3F,Sp,Su)

6810. Introduction to the Research Process. Essential scientific research concepts of theory development and data collection. The technology of research, including writing and funding proposals, experimental and study design, and project management. Includes a hands-on research project conducted by the student. (3Sp) ®

6950. Independent Readings. Specialized projects for graduate students. (1-3F,Sp,Su) ®

6970. Master's Paper. Master's-level thesis or Plan B research credit. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7250. Graduate Research Internship. For doctoral students desiring to improve their research capability. Prior approval required. Repeatable to a maximum of six credits. (1-3F,Sp,Su) ®

7330. School-Based Internship. Internship for doctoral candidates preparing to be school supervisors. Repeatable to a maximum of 9 credits. (3-9F,Sp,Su) ®

7610. Critical Analysis of Issues. Examines critical analysis/thinking techniques, creative problem solving, and the identification of issues and trends in the field. (3Su)

7950. Independent Readings. Independent readings for graduate students. Repeatable to a maximum of 6 credits. (1-3F,Sp,Su) ®

7970. Doctoral Dissertation. Doctoral-level dissertation research credit. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of

Chemistry and Biochemistry

College of Science

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Office in Maeser Lab 106, (435) 797-1697

Associate Head: Professor *Stephen E. Bialkowski,* analytical chemistry
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Professors *Steven D. Aust,* biochemistry; *David Farrelly,* physical chemistry; *Edward A. McCullough, Jr.,* physical chemistry; *William H. Scouten,* biochemistry; *Michael E. Wright,* organic chemistry; **Distinguished Professor Emeritus** *R. Gaurth Hansen;* **Professors Emeritus** *William M. Moore,* physical chemistry; *Richard K. Olsen,* organic chemistry; *Grant G. Smith,* organic chemistry; *Jack T. Spence,* inorganic chemistry; **Associate Professors** *Ann E. Aust,* biochemistry; *Robert S. Brown,* analytical chemistry; *Bradley S. Davidson,* organic chemistry; *Scott A. Ensign,* biochemistry; *Richard C. Holz,* inorganic chemistry; *John L. Hubbard,* inorganic chemistry; *Lance C. Seefeldt,* biochemistry; *Greg M. Swain,* analytical chemistry; **Associate Professor Emeritus** *Thomas M. Farley,* biochemistry; **Assistant Professors** *Lisa M. Berreau,* inorganic chemistry; *Alvan C. Hengge,* organic chemistry; *John W. Peters,* biochemistry; **Research Assistant Professor** *Thomas A. Grover,* biochemistry; **Adjunct Assistant Professor** *James S. Dyer,* physical chemistry

Degrees Offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Doctor of Philosophy (PhD) in Chemistry; MS and PhD in Biochemistry

Undergraduate emphases: *BS*–Professional Chemistry, Biochemistry, Chemical Education, Life Science, Teaching Major in Chemistry, Physical Science Composite Teaching; *BA*–Chemistry; **Graduate specializations:** *MS, PhD*–Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry

Undergraduate Programs

Objectives

Chemistry is a subject that addresses the properties of materials and the transformations that they undergo. Especially important are aspects of energy and structure related to chemical reactivity. Consequently, students of many disciplines take courses in chemistry to learn about the behavior of the substances they will use or reference. The Department of Chemistry and Biochemistry offers a wide variety of courses for those whose majors and/or anticipated careers require a knowledge of chemistry. These areas of study include nutrition, engineering, biology, agriculture, natural resources, medicine, law, and education, to name a few. Many students also choose chemistry as an elective course to better prepare themselves as citizens in a technological world.

The **Bachelor of Science Degree** entails considerable specialization in chemistry and related areas. The BS emphases require a common core of courses, but allow for a different concentration of advanced work according to the interests and career objectives of the student. The **BS with Professional Chemistry Emphasis** and **BS with Biochemistry Emphasis** degrees meet the requirements for certification by the American Chemical Society (ACS). The certified degree emphases provide excellent preparation for immediate entry into the job market or for graduate school in chemistry, biochemistry, chemical engineering, molecular biology, nutrition, food science, materials science, and a wide variety of other fields. ACS certification in **Chemical Education** is available to students who complete an ACS-certified program, together with the Professional Education program in secondary education. The **BS with Life Science Emphasis** degree is popular for students wishing to go on to medical or dental graduate programs. The life science emphasis is particularly appropriate for **premedical** and **predental** students who want a strong base for understanding the nature of chemical reactions in the body and the behavior of the drugs they will prescribe, or who want an attractive alternative should they decide ultimately not to pursue medical or dental school. The **Chemistry Teaching Major** or the **Composite Teaching Major in Physical Science** are available to those who want a career in secondary education. The BA degree is an excellent choice for students with an interest in studying **law** or **business** and who have an interest in science.

The core of the program utilizes year-long sequences of classes. The first-year sequence introduces the basic principles of chemistry, as well as most of the major concepts of the science. The second year explores in greater depth the characteristics of carbon-based compounds that serve as the backbone for the chemistry of life; for most drugs and medicines; for petroleum; for most fibers, paints, and plastics; and for many other commercial products. The third year examines in greater depth the models, theories, and mathematical interpretation of the structures, rates of change, energetics, and other properties of chemicals. In addition, one-semester courses examining the chemistry of life processes, the behavior of inorganic substances, and the analysis of the composition of substances are required. Many of the sequences have associated laboratory courses where students get hands-on practice. Here they synthesize compounds, measure physical properties, analyze samples, and determine

structural features of compounds, using modern techniques and instrumentation. The requirements of the BS and BA degrees in chemistry, along with University and University Studies requirements, are summarized here. The specific requirements for the teaching major and for the composite teaching major in physical science are also included.

Students are also urged to study these requirements and to visit with their adviser on a regular basis about progress toward the completion of their degrees or for any questions regarding complementary courses and career goals.

General Requirements

Admission Requirements. First-year students admitted to USU in good standing qualify for admission to this major. Transfer students from other institutions need a 2.2 transfer GPA, and students transferring from other USU programs need a 2.0 total GPA for admission to this major in good standing.

Students interested in studying chemistry should take high school mathematics courses that will enable them to start calculus during their first semester at USU. High school coursework in chemistry and physics is also desirable. AP credit in chemistry may be counted toward the degree if the student passes a departmental challenge exam. For details, contact the departmental advising faculty.

No Chem prefix course may be applied toward graduation with any major in chemistry with an earned grade of less than *C-*. Except for Chem 4800 and 4990, no Chem prefix course may be taken on a *Pass/Fail* basis. No Chem prefix course may be repeated more than one time to improve the grade to a *C-* or better. A student dropped from the chemistry program for failure to meet this standard may appeal to the departmental Curriculum Committee for readmission.

Chemistry Core Curriculum

In addition to the University Studies requirements for graduation, chemistry majors take a series of core courses spread across a traditional four-year period. The completion of the chemistry core also covers the College of Science requirements for graduation.

First Year: Chem 1210, 1220, 1230, 1240; Math 1210, 1220.

Second Year: Chem 2310, 2320, 2330, 2340, 3510, 3520, 3600, 3610; Phyx 2210, 2220; Math 2210.

Third Year: Chem 3060, 3070, 3080, 3090, 5700; Math 2250 *or* Stat 3000 (optional for Chemistry Teaching Major).

Fourth Year: Chem 4990.

Chemistry Emphases Requirements

Professional Chemistry Emphasis (ACS Certified). In addition to the chemistry core, Chem 5520, 5530, 5640, 5650; and 6 advanced electives, as approved by the department, are required.

Biochemistry Emphasis (ACS Certified). In addition to the chemistry core, Chem 5640, 5650, 5710, 5720; Biol 1210, 1230; and 6 advanced electives, as approved by the department, are required.

Chemical Education Emphasis (ACS Certified). In addition to the chemistry core, Chem 5520 and 5530, *or* Chem 5640 and 5650, *or* Chem 5710 and 5720; teaching certification courses as specified by the Department of Secondary Education (35 cr.); and teaching minor from outside the Department of Chemistry and Biochemistry (12-16 cr.) are required.

BS Degree with Honors. This option can be met by completing any ACS certified program and by meeting the following requirements: Minimum GPA of 3.50 in chemistry courses; overall GPA of 3.30; 13 credits of honors work as follows: 3-6 credits of Chem 4800H (Research Problems), 3 credits chosen from Chem 2320H, 3070H, 5640H, or 5700H, 1 credit of Chem 4990H (Undergraduate Seminar), and 3-6 credits selected from Honors courses numbered 3000 or above in chemistry or related subjects, as appropriate. Three credits may be selected from chemistry courses numbered 6000 or above. Students must be admitted to Honors through the Honors Program Office.

BS in Chemistry, Life Science Emphasis. In addition to the chemistry core, Biol 1210, 1230; Biol 1220 and 1240, *or* Biol 2000; Biol 2200 or 3300; and Chem 5710, 5720 are required.

BA in Chemistry: In addition to the chemistry core, Chem 5520 or 5640; and two years of foreign language are required.

Chemistry Teaching Major: In addition to the chemistry core (minus the Math 2250 or Stat 3000 courses), Sci 4300, teacher certification courses offered by Secondary Education (35 cr.), and a teaching minor from outside the Department of Chemistry and Biochemistry (12-16 cr) are required. An overall 2.75 GPA in a minimum of 60 semester credits of approved University coursework is required for admission into the Professional Education programs. A minimum overall GPA of 2.75 is required for graduation. Specific for admission to this program, a student must have at least a 2.75 GPA in Chem 1210, 1220, 1230, and 1240.

Composite Teaching Major in the Physical Sciences. This degree is available through the Chemistry and Biochemistry or Physics departments. Students with a Composite Teaching Major in Physical Sciences should plan their programs carefully in order to meet the upper-division requirement for graduation. An overall 2.75 GPA in a minimum of 60 semester credits of approved University coursework is required for admission into the Professional Education programs. A minimum overall GPA of 2.75 is required for graduation.

Specific for admission to this program, a student must have at least a 2.75 GPA in the following chemistry and physics courses: Chem 1210, 1220, 1230, 1240; Phyx 2110, 2120, *or* Phyx 2210, 2220 (preferred). *This program does not include many aspects of the Chemistry Core.*

Required Courses: Chem 1210, 1220, 1230, 1240; Chem 2300 or 2310; Chem 2330; Phyx 1000; Phyx 1030 or 3030; Phyx 2110 and 2120, *or* Phyx 2210 and 2220; Math 1210, 1220; Stat 3000; Sci 4300; Biol 1010; Geol 1150; Bmet 2000; and teacher certification courses from Secondary Education (35 cr.). A teaching minor is optional for the Composite Teaching Major in the Physical Sciences.

Chemistry Minor. In addition to Chem 1210, 1220, 1230, and 1240, 10 additional credits in Chemistry prefix courses at the 2000 level or higher are required.

Chemistry Teaching Minor. In addition to Chem 1210, 1220, 1230, 1240, Chem 2300 or 2310, and Chem 2330, 3 additional credits selected from the following are required: Chem 2320 (if Chem 2310 has been previously selected), Chem 3060, *both* Chem 3510 and 3520, Chem 3600, Chem 3650, or Chem 3700.

Career Opportunities

Chemistry degree holders work in a wide variety of

professions, from physicians, lawyers, and professors to research/development, sales, or production in the chemical, oil, pharmaceutical, metals, electronic, and biochemical industries. Government at all levels employs chemists, including the federal Departments of Defense, Health and Human Services, Agriculture, and Interior. A graduate with a bachelor's degree often begins work in chemical analysis or sales or may assist senior chemists in research and development. A graduate with a teaching major or chemistry education emphasis may teach in public schools. A graduate degree is usually needed to direct research or teach at the university level. Degree holders from the Department of Chemistry and Biochemistry have had excellent success in obtaining support for graduate studies, often at very prestigious institutions, and in obtaining employment directly following graduation. For further information, students should contact their adviser.

Graduate Programs

Admissions Requirements

See the general admission requirements for the School of Graduate Studies (pages 60-61). All applicants should have a bachelor's degree or master's degree in chemistry or biochemistry from an accredited institution. Foreign applicants need to take the GRE subject exam (Chemistry or Biochemistry) in addition to the general GRE exam. Appropriate undergraduate preparation is expected; applicants not fully prepared may be admitted with the condition that appropriate undergraduate courses are taken as necessary.

Applications are especially encouraged during the spring semester for expected admission in the following fall semester. However, the Graduate Recruiting and Admissions Committee screens applications throughout the year. Detailed information about the graduate programs and faculty research activities can be found on the Internet at http://www.chem.usu.edu.

Degree Programs

Master of Science. To earn an MS in chemistry or biochemistry, a student must meet the general requirements of the School of Graduate Studies (see pages 64-65), conduct research under the direction of a major professor and write a thesis acceptable to a supervisory committee (Plan A) or write a review-of-literature paper (Plan B), and pass an oral examination that is principally a defense of the thesis or the Plan B paper.

Qualified undergraduate chemistry majors at USU may apply in the third year for admission to the MS program. Students may be admitted to this MS program if they have a *B* average in chemistry, physics, and mathematics courses, and have completed the one-year sequences in general, organic, and physical chemistry (including labs), two courses in analytical or inorganic chemistry, two semesters of physics, math through Math 2210, and at least 15 credits of their University Studies requirements.

Students should consult with the chairman of the Graduate Recruiting and Admissions Committee to be certain of their eligibility for this program. The chairman will then submit an application to the department head and to the School of Graduate Studies for approval. Students must earn a satisfactory grade on the GRE exam before the completion of the MS degree. All requirements for the BS degree must be completed within two semesters of admission. The MS coursework cannot include coursework counted toward the BS degree.

Doctor of Philosophy. To earn the PhD in chemistry or biochemistry, a student must successfully complete a core curriculum of courses and other courses as approved by a supervisory committee. In addition, preliminary examinations (both oral and written) must be passed and research in a field of specialization must be conducted. The final requirement is the writing and defense of a dissertation before the student's supervisory committee.

Biochemistry Course Requirements. Every MS and PhD student in the biochemistry program must complete Chem 6700 and 6710. In addition, all students must register for at least 2 credits of Chem 6720 in the first semester of residence to participate in research training. Both MS and PhD students must complete a total of at least 16 credits in coursework, exclusive of seminar and research credit. The Program of Study is approved by the student's supervisory committee. A total of 30 credits is required for the MS degree, and a total of 90 credits is required for the PhD. Beginning students who already hold an MS degree need 60 credits to complete the PhD program.

Chemistry Course Requirements. Every MS and PhD student in the chemistry program must complete the core courses Chem 6000, 6300, 6500, and 6600. This sequence is usually completed in the first two semesters of residence. Both MS and PhD students must complete a total of at least 16 credits in coursework, exclusive of seminar and research credit. The Program of Study is approved by the student's supervisory committee. A total of 30 credits is required for the MS degree and a total of 90 credits is required for the PhD. Beginning students who already hold an MS degree need 60 credits to complete the PhD program.

Financial Assistance

The department offers financial support to students in the form of teaching assistantships, research assistantships, and fellowships. All applications for admission to the School of Graduate Studies constitute an application for financial assistance; it is not necessary to file a separate request. Teaching assistantships are the principal means of support for first-year students. Inquiries about current support levels should be directed to the department main office. The department is responsible for the first nine months of stipend and tuition, with the remaining summer stipend and tuition usually being paid from faculty research funds. Teaching assistants devote no more than 12 contact hours per week directing undergraduate laboratories, leading recitation sections, and assisting students with questions during the regular fall and spring semesters. Research assistantships, funded from individual faculty research grants, support students conducting research related to the grant projects. Although first-year students are not normally supported as research assistants, well-prepared students may be eligible for research support at the discretion of their major professor.

Fellowships are awarded by the University to outstanding students solely on the basis of merit. The department encourages students with strong academic records to apply for the University

fellowships and national awards, and will provide assistance in obtaining and submitting the appropriate forms. Additionally, several graduate awards are given each year to honor exemplary performance in research and teaching.

The College of Science recently established the Willard L. Eccles Foundation Science Fellowship. The $15,000 per year, three-year stipend is competitively awarded to highly qualified science applicants. Students applying to the graduate program will be considered for this fellowship, and will be sent the necessary information. The application deadline for this fellowship is February 1.

Chemistry and Biochemistry Courses (Chem)

BPS 1010. Introduction to Chemistry. For nonscience majors. Includes basic chemical concepts and a survey of the various branches of chemistry. Heavy emphasis on everyday applications to problems involving environmental pollution, radioactivity, energy sources, and human health. No prerequisites. (3F,Sp,Su) ©

1110. General Chemistry I. For nonscience majors. Progression made from the basic tenets of general chemistry to introduction to organic chemistry, with ascent in terms of practical importance and sophistication. Prerequisite: High school or college algebra. (4F,Sp)

BPS 1120. General Chemistry II. Continuation of Chem 1110. Continued coverage of organic chemistry, along with introduction to biochemistry. Prerequisite: Chem 1110. (4F,Sp)

1130. General Chemistry Laboratory. Laboratory course designed to accompany Chem 1110. Covers basic aspects of general chemistry. (1F)

1210. Principles of Chemistry I. First of a two-semester sequence, covering fundamentals of chemistry. Designed for science and engineering students. Prerequisite: Completion of or concurrent enrollment in Math 1050. High school chemistry recommended. (4F,Sp)

BPS 1220. Principles of Chemistry II. Continuation of Chem 1210. Prerequisite: Chem 1210. (4F,Sp)

1230. Chemical Principles Laboratory I. Laboratory course designed to be taken concurrently with Chem 1210. Experiments cover acids/bases, thermochemistry separations, molecular weights, gases, and spectroscopy. Prerequisite: Chem 1210 (may be taken concurrently). (1F,Sp)

1240. Chemical Principles Laboratory II. Continuation of Chem 1230. Normally taken concurrently with Chem 1220. Experiments cover elementary kinetics, electrochemistry, gravemetric analysis, chromatography, and equilibria. Prerequisite: Chem 1230. (1F,Sp)

1950. Glass Blowing. Laboratory course designed to introduce basic techniques in glass blowing for chemical applications. (1Sp)

2300. Principles of Organic Chemistry. Shape, bonding, nomenclature, stereochemistry, physical properties, and reactivity of organic molecules is covered for a range of molecules, beginning with simple alkanes and finishing with some of the more complex abiotic and biotic organic molecules known today. Prerequisite: Chem 1210. (3F)

2310. Organic Chemistry I. First of a two-semester sequence, covering physical properties, nomenclature, mechanisms of reactions, and biological relevance of organic and bioorganic molecules. Prerequisite: Chem 1220. (3F,Sp)

2320. Organic Chemistry II. Continuation of Chem 2310. Prerequisite: Chem 2310 *or* Chem 2300 and permission of instructor. (3F,Sp)

2330. Organic Chemistry Laboratory I. Laboratory course designed to accompany Chem 2310. Covers basic aspects of experimental organic chemistry. Prerequisites: Chem 1220, 1240; concurrent enrollment in Chem 2310 or 2300. (1F,Sp)

2340. Organic Chemistry Laboratory II. Continuation of Chem 2330. Prerequisite: Chem 2330. (1Sp)

QI 3060. Physical Chemistry. Chemical thermodynamics. Laws of thermodynamics. Changes of state. Chemical equilibrium. Introduction to quantum mechanics. Schrodinger equation. Exactly-soluble problems. Prerequisites: Chem 1220, Math 2210, Phyx 2220. (3F)

QI 3070. Physical Chemistry. Chemical applications of quantum mechanics, periodic table, and chemical bonding. Spectroscopy. Statistical thermodynamics. Chemical kinetics. Rate laws. Reaction mechanisms. Theories of reaction rates. Prerequisite: Chem 3060. (3Sp)

CI 3080. Physical Chemistry Laboratory I. Experimental work to accompany Chem 3060. Corequisite: Chem 3060. (1F)

CI 3090. Physical Chemistry Laboratory II. Continuation of Chem 3080. Experimental work to accompany Chem 3070. Corequisite: Chem 3070. (1Sp)

3510. Intermediate Inorganic Chemistry. Survey of basic structure, bonding, and reactivity across the periodic table. Prerequisite: Chem 1220. (2Sp)

3520. Inorganic Chemistry Laboratory. Covers basic aspects of inorganic synthesis and compound characterization. Prerequisite: Chem 3510 (may be taken concurrently). (1Sp)

QI 3600. Quantitative Analysis. Basic theory and laboratory practice in analytical chemistry, including introduction to multiple equilibria and chemical separation methods. Prerequisites: Chem 1230, 1240, Math 1050. (3F)

3610. Quantitative Analysis Laboratory. One three-hour laboratory per week. Must be taken concurrently with Chem 3600. Prerequisites: Chem 1230, 1240, Math 1050. (1F)

DSC 3650. Environmental Chemistry. Survey of issues and chemical nature of environmental problems, including air, soil, and water pollution. Prerequisite: Chem 1010 or 1120 or 1220. (3Sp)

3700. Introductory Biochemistry. Brief survey of the chemistry of biologically important compounds and their role in microbial, animal, and plant metabolism. Prerequisites: Chem 2300 or 2320 (may be taken concurrently). (3Sp)

3710. Introductory Biochemistry Laboratory. Laboratory course designed to accompany Chem 3700. Prerequisite: Chem 3700 (may be taken concurrently). (1Sp)

4250. Cooperative Experience. Planned work outside the University. Specific experience must receive prior approval for credit to be earned. Consult adviser or department head for details. (1-2F,Sp,Su) ®

CI 4800. Research Problems. Directed undergraduate research. Departmental permission required. (1-2F,Sp,Su) ®

CI 4990. Undergraduate Seminar. Writing and speaking skills necessary for presenting scientific information. (1F,Sp) ®

5160. Methods in Biotechnology: Cell Culture. Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. (3Sp)

5240. Methods in Biotechnology: Protein Purification Techniques. Reviews basic

methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: Chem 3700. (3Sp)

5260. Methods in Biotechnology: Molecular Cloning. Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: Chem 3700 or Biol 2200; or permission of instructor. (3)

5520. Advanced Inorganic Chemistry. Advanced treatment of the structure/bonding/reactivity relationships across the periodic table. Prerequisites: Chem 3070, 3510. (2F)

5530. Advanced Synthesis Laboratory. Laboratory course in advanced synthetic techniques, including vacuum lines, inert atmosphere, Schlenk manipulations, liquid ammonia solvent, and tube furnace reactions. Prerequisites: Chem 2340, 3080, 3520, 5520. (2Sp)

5640. Instrumental Analysis. Theory and application of physiochemical methods of analysis. Selected electrochemical and optical methods. Prerequisites: Chem 3080, 3610. (3Sp)

5650. Instrumental Analysis Laboratory. Laboratory course to accompany Chem 5640. Two three-hour labs per week. Prerequisites: Chem 3080, 3610. (2Sp)

5700. General Biochemistry I. General biochemistry for science majors, including proteins, enzymes, catalysis, bioenergetics, and catabolic metabolism. Prerequisite: Chem 2320. (3F)

5710. General Biochemistry II. Continuation of Chem 5700. General biochemistry for science majors, including anabolic metabolism, DNA, RNA, and protein synthesis. Prerequisite: Chem 5700. (3Sp)

5720. General Biochemistry Laboratory. Prerequisite: Chem 5710 (may be taken concurrently). (1Sp)

6000. Advanced Physical Chemistry. A first-year graduate course in physical chemistry. Prerequisites: Chem 3070, Math 2250. (3F)

6010. Quantum Chemistry. Quantum mechanics applied to chemical problems. Theory of atoms and molecules. Prerequisites: Chem 3070, Math 2250. (3Sp)

6300. Advanced Modern Organic Chemistry. Covers topics in stereochemistry, molecular structure, reaction mechanisms of organic molecules, and selected reactions. Prerequisites: Chem 2320, 3070. (3F)

6500. Reactivity and Mechanisms in Inorganic Chemistry. Inorganic reactions and mechanisms relevant to areas of main group, transition metals, and bioinorganic and organometallic chemistry. Prerequisite: Chem 5520. (3Sp)

6510. Chemical Applications of Group Theory. Introduction to symmetry point groups and theorems of group theory for application to structure, bonding, and spectroscopy. Some familiarity with linear algebra is recommended. Prerequisite: Chem 3070. (1F)

6600. Modern Chemical Analysis. Methodology and statistical treatment of chemical data, experimental design, quality control, and chemical separations. Prerequisite: Chem 5640. (3Sp)

6700. Protein Structure and Function, Enzyme Catalysis, and Metabolism I. Advanced study of current aspects of protein structure and function. Mechanisms of enzyme catalysis and catabolic metabolism. Prerequisites: Chem 3070 and 5710. (3F)

6710. Metabolism II and Advanced Nucleic Acid Biochemistry. Advanced study of current aspects of anabolic metabolism and nucleic acid biochemistry. Prerequisite: Chem 6700. (3Sp)

6720. Advanced Biochemistry Laboratory. To obtain advanced laboratory skills, students complete specific laboratory experiments in research laboratories of Chemistry and Biochemistry Department faculty members. (2F,Sp) ®

6910. Special Problems in Chemistry and Biochemistry. Selected problems in chemistry and biochemistry. Registration permitted only with written permission from department head. (1-4F,Sp,Su)

6970. Thesis Research. Research for MS degree. (1-10F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7000. Chemical Kinetics. Theory of reaction rates with application to current research. Prerequisite: Chem 6000. (3F)

7010. Chemical Thermodynamics. From the standpoint of Gibbs. Prerequisite: Chem 3070. (3F)

7020. Statistical Mechanics. Statistical mechanics with applications to research problems of current interest. Prerequisite: Chem 6010. (3)

7030. Special Topics in Physical Chemistry (Topic). Covers special areas of current interest and activity in physical chemistry. Prerequisite: Chem 6000. (3F,Sp) ®

7300. Reactions and Synthesis in Modern Organic Chemistry. Reactions of modern organic chemistry and their application to organic synthesis. Prerequisite: Chem 6300. (3Sp)

7310. Molecular Structure/Spectroscopy of Organic Compounds. Modern methods of predicting and determining molecular structure of organic compounds using advanced computational and spectroscopic tools. Prerequisite: Chem 6300. (3F)

7330. Special Topics in Organic Chemistry (Topic). Covers special areas of current interest and activity in organic chemistry. Prerequisite: Chem 6300. (3F,Sp) ®

7500. Coordination Chemistry. Theory and spectroscopy of transition metal coordination complexes. Prerequisites: Chem 3070, 6500, 6510. (3Sp)

7510. Bioinorganic Chemistry. Advanced systematic study of metallobiochemical structure and function. Prerequisite: Chem 6500. (3Sp)

7530. Special Topics in Inorganic Chemistry (Topic). Topics of current interest in inorganic chemistry. Prerequisite: Chem 6500. (3Sp) ®

7600. Analytical Spectroscopy. Practical description of spectroscopy-based analysis, emphasizing instrumentation and methods. Prerequisites: Chem 5640, graduate standing, or instructor's permission. (3Sp)

7610. Chemical Separations. Survey of theory and practice of modern chemical separations, including extractions, chromatography, distillation, and phase separations. Prerequisite: Chem 5640 or instructor's permission. (3F)

7620. Electrochemistry. Survey of electrochemistry with emphasis on electrochemical analysis. Prerequisite: Chem 5640. (3F)

7640. Special Topics in Analytical Chemistry (Topic). Topics may include electronics from the scientist's perspective, laser-based spectroscopy, mass spectrometry, and chemometrics. Prerequisite: Chem 6600. (1-3F,Sp) ®

7770. Special Topics in Biochemistry (Topic). Topics of current interest in biochemistry. Prerequisite: Chem 6710 (2-3) ®

7800. Seminar. Graduate seminar. (1F,Sp,Su) ®

7970. PhD Dissertation Research. (1-10F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of
Civil and Environmental Engineering

College of Engineering

Head: Professor Loren R. Anderson, geotechnical engineering
Office in Engineering Laboratory 211, (435) 797-2932

Undergraduate Division Heads:

Civil Engineering: Associate Professor *Kevin C. Womack*, structural mechanics
Environmental Engineering: Professor *R. Ryan Dupont*, biological waste treatment

Graduate Program Division Heads:

Environmental Engineering: Professor *R. Ryan Dupont*, biological waste treatment
Geotechnical Engineering: Associate Professor *Joseph A. Caliendo*, geotechnical engineering
Structural Engineering: Associate Professor *Kevin C. Womack*, structural mechanics
Transportation Engineering: Associate Professor *Prianka N. Seneviratne*, transportation engineering
Water Engineering: Professor *William J. Rahmeyer*, hydraulics, hydraulic structures, scour and erosion

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Professors *A. Bruce Bishop*, engineering systems and planning; *David S. Bowles*, risk assessment, hydrology, water resources engineering; *William J. Grenney*, Advanced Center for Transportation Studies; *Daniel H. Hoggan*, hydrologic and hydraulic modeling; *Roland W. Jeppson*, numerical modeling; *Upmanu Lall*, climate modeling, statistical hydrology, water resource systems; *Ronald C. Sims*, hazardous waste management; *J. Paul Tullis*, hydraulics, hydraulic structures, and hydromachinery; *Muzz Yener*, structural engineering and mechanics; **Professors Emeriti** *Jay M. Bagley*, hydrology, water resources; *W. O. Carter*, structures; *Calvin G. Clyde*, fluid mechanics and groundwater; *Irving S. Dunn*, geotechnical engineering; *Gordon H. Flammer*, hydraulics; *Trevor C. Hughes*, water resources systems analysis; *C. Earl Israelsen*, hydrology, hydraulics, water resources, erosion control; *Fred W. Kiefer, Jr.*, geotechnical engineering; *Elliot Rich*, structural engineering; *J. Paul Riley*, water resources systems, hydrology; *Reynold K. Watkins*, geotechnical engineering; **Adjunct Professors** *D. Jack Adams*, microbiology and bioremediation; *Lloyd H. Austin*, water resources; *Ibrahim M. Elassiouti*, water resources; *George G. Goble*, deep foundations and structural dynamics; *Jeffrey R. Keaton*, geotechnical engineering, engineering geology; *Robert T. Pack*, engineering geology, geomatics and GIS; *Neil Parrett*, performance and safety of dams; *Norman E. Stauffer, Jr.*, engineering hydrology and computer modeling; *Daniel A. Stone*, environmental chemistry; **Associate Professors** *William J. Doucette*, environmental analytical chemistry; *Thomas B. Hardy*, ecological system modeling, statistical analysis; *Marian W. Kemblowski*, groundwater, numerical modeling; *Audrey D. Levine*, wastewater, characterization treatment; *Michael J. McFarland*, environmental engineering; *David K. Stevens*, treatment process analysis; *David G. Tarboton*, hydrology and water resources; *J. Derle Thorpe*, engineering materials, measurements; *Gilberto E. Urroz-Aguire*, hydraulics, hydraulic structures; **Research Associate Professor** *Darwin L. Sorensen*, aquatic microbiology; **Adjunct Associate Professors** *David G. Blake*, transportation engineering; *Witold F. Krajewski*, hydrology/climatology; *Harvey J. Miller*, GIS; *Eva C. Nieminski*, water quality; **Assistant Professors** *Marvin W. Halling*, structural dynamics, earthquake engineering; *Daniel P. Smith*, anaerobic biological processes; **Research Assistant Professors** *Joan E. McLean*, fate and behavior of metals in subsurfaces; *Judith L. Sims*, fate and behavior of organic chemicals; *Blake P. Tullis*, hydraulics, hydraulics structures, and hydromachinery; **Adjunct Assistant Professors** *Dan F. Atkins*, engineering materials; *Mufeed M. Odeh*, physical and mathematical modeling of hydraulic systems; *Bonnie K. Ray*, linear and nonlinear time series modeling and forecasting; **Affiliate Faculty** *Robert W. Hill*, professor, Biological and Irrigation Engineering; *John E. Keith*, professor, Economics; *Jack Keller*, professor emeritus, Biological and Irrigation Engineering; *Jeffrey J. McDonnell*, adjunct assistant professor, Forest Resources, Geography and Earth Resources; *Michael P. O'Neill*, associate professor, Geography and Earth Resources; *Wynn R. Walker*, professor, Biological and Irrigation Engineering

Degrees offered: Bachelor of Science (BS) in Civil Engineering; BS in Environmental Engineering; Master of Engineering (ME), Master of Science (MS), Civil Engineer (CE) and Doctor of Philosophy (PhD) in Civil and Environmental Engineering

Graduate specializations: Environmental Engineering, Fluid Mechanics and Hydraulic Engineering, Geotechnical Engineering, Hazardous Waste Management, Structural Engineering and Mechanics, Transportation Engineering, Water Engineering, Water Resources Engineering and Hydrology

Undergraduate Programs

Objectives

Civil and Environmental Engineering is concerned with planning, designing, constructing, and operating various physical works; developing and utilizing natural resources in an environmentally sound manner; providing the infrastructure which supports the highest quality of life in the history of the world; and protecting public health and renovating impacted terrestrial and

aquatic systems from the mismanagement of toxic and hazardous wastes. In order to prepare students to meet these challenges facing our global society, the Department of Civil and Environmental Engineering offers Bachelor of Science degrees in Civil Engineering and in Environmental Engineering. The goal of each program is to take bright and creative students and increase their technical knowledge, problem solving skills, creative thinking, ability to learn, self-confidence, professional ethics, social responsibility, ability to work as a team, and global perspective. The Civil Engineering and Environmental Engineering degree programs are both accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

The curriculum for both the Civil Engineering program and the Environmental Engineering program provides an educational experience that integrates the humanities and social sciences and the basic fundamentals of mathematics, science, and engineering science with appropriate laboratory and engineering design activities. This program of study prepares students to begin practicing their profession. Civil and Environmental Engineering is a broad and diversified profession, offering a variety of career opportunities in small towns and giant metropolises. Civil and environmental engineers may be involved in office jobs dealing with clients or engaged in planning, design, or project management. They may also be involved in field work, gathering information at project sites, or managing construction.

Requirements

Admission Requirements. Admission requirements for the Department of Civil and Environmental Engineering are the same as those described for the University on pages 43-46. Students in good standing may apply for admission to the department. In addition, students must maintain the academic requirements outlined for the College of Engineering on pages 77-78.

Bachelor of Science Degrees. The Department of Civil and Environmental Engineering offers two Bachelor of Science degrees: one in Civil Engineering and one in Environmental Engineering. The four-year programs leading to these two degrees are listed below. During the first two years, students are in a pre-engineering program. Students must successfully complete the pre-engineering program or, in the case of transfer students, substantially equivalent coursework at another institution before they are accepted into the professional program. Transfer students may apply for permission to take upper-division courses in cases where postponement of these courses will prolong the student's time to graduate.

Design is a cornerstone of engineering that requires creative thinking, technical knowledge, the ability to organize and solve complex problems, and teamwork. Engineering design activities begin during the first two years and progress in-depth as each student's proficiency increases. These design activities culminate in a major senior design course, which integrates past engineering coursework into a focused, realistic design project. An important feature of the senior design experience is that students work in teams to complete the project.

The student who is majoring in or planning to major in Civil Engineering or Environmental Engineering needs to be aware of the College of Engineering requirements concerning admission to the college, pre-engineering program, admission to professional engineering programs, University Studies (General Education), and other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 76-78. It is the responsibility of the student to be aware of these rules and regulations. **Passing the Fundamentals of Engineering Exam is required for graduation**.

Also, all undergraduate CEE students are required to have an HP-48G or S series calculator. Although not a requirement at this time, CEE students are strongly encouraged to have a modern desktop or laptop personal computer. Since computer technology is changing rapidly, students should seek advice from a knowledgeable professional on hardware and software requirements before purchasing a computer.

Undergraduate Course Requirements for Civil Engineering

Preengineering Program (freshmen and sophomore years): CEE 1880, 2240, 2870, 3030; Engr 1010, 2000, 2020, 2040, 2200, 2210; ITE 2270; Chem 1210; Engl 1010, 2010; Geol 1150; Math 1210, 1220, 2250; Phyx 2200 (or High School Physics), 2220; University Studies (General Education) courses (see College of Engineering University Studies requirements).

Professional Engineering Program (junior and senior years): CEE 3010, 3080, 3210, 3430, 3500, 3510, 3610, 3870, 4200, 4300; MAE 2060; Civil Engineering Design Elective, one course chosen from: CEE 5070, 5230, 5320, 5460, 5540; Design project consisting of CEE 3880, 4870, and 4880; Technical electives (15 credits) chosen from: CEE 3640, 3670, 3780, 5010, 5070, 5080, 5100, 5190, 5220, 5230, 5240, 5320, 5430, 5450, 5460, 5470, 5540, 5550, 5560, 5690, 5700, 5860, 5870, 5880, MAE 2400; University Studies (General Education) courses (see College of Engineering University Studies requirements).

Undergraduate Course Requirements for Environmental Engineering

Preengineering Program (freshman and sophomore years): CEE 1880, 2240, 2890; Engr 1010, 2000, 2020, 2040, 2200; ITE 2270; MAE 2400; Biol 1210, 3300; Chem 1210, 2300; Engl 2010; Math 1210, 1220, 2250; Phyx 2200 (or High School Physics), 2220; University Studies (General Education) courses (see College of Engineering University Studies requirements).

Professional Engineering Program (junior and senior years): CEE 3030, 3430, 3500, 3510, 3640, 3670, 3780, 3870, 3890, 4200, 5610, 5860; PubH 3310; Environmental Engineering Design Elective, one class chosen from: CEE 5690 (Natural Systems Area), 5810 (Water Area), 5880 (Solids Area); Design project consisting of CEE 3890, 4790, 4890. Technical Electives (5 credits) chosen so that, along with the Environmental Engineering Design Elective, the student's program will have at least one course from three of the following four Technical Elective Areas: *Solids*—CEE 5680, 5830, 5870; *Water*—CEE 5430, 5620, 5810; *Natural Systems*—CEE 5700, FW 4500, 5200; *Occupational Safety and Health*— CEE 5710, 5790, PubH 5310, 5320, 5330. University Studies (General Education) courses (see College of Engineering University Studies requirements).

Additional Information

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheet, available from the Civil and Environmental Engineering Department.

Departmental honors can be earned by completing 20 credits of upper-division honors engineering courses. Students should work with the department in selecting appropriate courses.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. Admission committees consider GRE scores and experience, undergraduate record and curriculum, and formal recommendations. A student without an undergraduate civil and environmental engineering background may be required to complete selected undergraduate courses prior to admission as a fully matriculated graduate student.

Graduate Program Divisions

The graduate program in the Department of Civil and Environmental Engineering is administered through five academic divisions, as described below.

Structural Engineering. The structural engineer is involved in the design, construction, repair, and retrofit of all types of structures: buildings, bridges, dams, and many others. The safety of the structures we occupy and utilize every day is the responsibility of structural engineers. They must be able to evaluate the loads placed on a structure, determine their effects on the structure, and select the appropriate materials and structural elements, or repair strategy, to withstand these loads. Today's structural engineer is using new space materials in the design of new structures or the retrofit of older structures.

Mathematics, physics, and materials science constitute a foundation for structural engineering. Structural analysis and design are added to this foundation and become the focus of the structural engineering program. Graduate students in the structures program also engage in structural mechanics, numerical methods, structural dynamics, geotechnical engineering, and the study of new structural materials. Current research in the structures area is focusing on the dynamic characteristics of structures, their potential response to earthquakes, and new seismic retrofit measures, using advanced composite materials, for older structures. Materials research is focusing on cementious materials and constitutive modeling.

Geotechnical Engineering. Engineering studies of soils are concerned with the physical and engineering properties of soils and how these are related to engineering projects.

Traditional geotechnical engineering includes the application of engineering principles to the analysis and/or design of building foundations, earth embankments, retaining walls, drainage systems, earthquake motion, buried structures, and other systems involving soil and rock. Engineers and architects cannot ignore the problems of investigating properties of soils in connection with engineering construction. Undergraduate and graduate courses offered by the department provide the basic knowledge necessary for the design of foundations and various types of earth structures. Fundamental concepts and their application are emphasized so that the student will be properly trained for his or her initial job, as well as being prepared to understand future development in this field.

The Geotechnical Engineering Division, in cooperation with the Environmental Engineering Division, is offering a new program in Geoenvironmental Engineering. This new program uses the strengths of both divisions to provide a program involving the geotechnical aspects of hazardous waste management, the investigation of hazardous waste sites, and the design of hazardous waste containment systems.

The geotechnical division has a strong research program. Current research projects in this division include studies on liquefaction, seismic slope stability, pile foundations, landslides, mechanically stabilized embankments, risk analysis of dams, finite element analysis of soil-structure systems, and the long-term properties of clay soils used in hazardous waste containment systems.

Water Engineering. The Water Division embraces strong academic programs in fluid mechanics and hydraulics, groundwater, hydrology, and water resources engineering. Faculty members are nationally and internationally renowned. They are very active in research, in professional organizations, and are in demand for consulting activities. Also, they are highly committed to guiding students through their research and coursework programs.

Graduate students have the opportunity for research support through the Utah Water Research Laboratory (UWRL) while working on theses or dissertations.

Fluid Mechanics and Hydraulic Engineering. Fluid mechanics and hydraulic engineering covers both fundamental principles and theory and their applications in a variety of engineering fields. Elementary fluid mechanics, based on fundamental principles of conservation of mass and the energy and momentum principles, is the logical core for all water-related engineering programs. Consequently, other specialties in water engineering, such as hydrology, water resources, groundwater, environmental engineering, irrigation, drainage, geotechnical engineering, and watershed science, study fluid mechanics. Students specializing in fluid mechanics and hydraulics emphasize theoretical fluid mechanics, hydraulic design, numerical methods, and laboratory hydraulic techniques.

A good variety and balance of courses and supporting research in theoretical fluid mechanics, open channel hydraulics, hydraulic design, transients, sedimentation, municipal water system design, cavitation, and porous media are available at the graduate level. Graduates from the fluid mechanics and hydraulics program find employment in a broad range of professional engineering fields, including private consulting, university teaching and research, and government service.

A *groundwater emphasis* within the fluid mechanics and hydraulic engineering specialization is concerned with the transport of fluids in the subsurface environment. It encompasses the theory of flow in porous media, groundwater hydrology and hydraulics, fate and transport of contaminants in subsurface, and analytical and numerical modeling of such processes. Emphasis is placed on the quantitative analysis of the physical and chemical

principles governing these processes and on the application of these principles to practical field problems, with all their difficulties related to the complex structure of subsurface formations. Examples of such problems include groundwater supply and management, subsurface cleanup technologies, and analysis and remediation of groundwater contamination. These problems are of a multidisciplinary nature, and their solutions require a multidisciplinary approach, involving, among others, soil and water chemistry, chemical engineering, and economics. The groundwater professional is an important team player in solving such problems.

The groundwater emphasis has a strong research component. Current research activities cover a well-balanced variety of topics, from theoretical (e.g., stochastic analysis of transport of contaminants in groundwater) to practical problems (e.g., design of cleanup technologies for gasoline-contaminated sites).

Hydrology is a branch of geoscience concerned with the origin, distribution, movement, and properties of the waters of the earth. The hydrologic cycle encompasses the atmosphere, the land surface, lakes and oceans, and the subsurface. Complex, interacting processes at varied time and space scales describe the hydrologic cycle. The concepts and practice of hydrology derive from an integration of field observations, laboratory investigations, and conceptual, mathematical, chemical, statistical, and probabilistic models.

The hydrology program at USU has strength in both the theoretical and applied aspects of modern hydrology. Past and present research focuses on a broad spectrum of hydrologic problems. These range from climate modeling, rainfall processes, floods, droughts, terminal lake analyses, soil erosion, and stream water quality models to groundwater contamination characterization and rededication, and watershed analyses. Excellent laboratory and computing facilities are available. Strong, continuous state and federal research funding keeps the research topics and facilities current.

The hydrology faculty are committed to a strong academic program. The hydrology curriculum is one of the most comprehensive offered in the U.S. Elements of ongoing research projects are routinely and effectively incorporated into the classes. Students are encouraged to design a degree program that best suits their interests. In addition to the course offerings in the program, a variety of appropriate classes are available through Mathematics and Statistics; Computer Science; Watershed Science; Geography and Earth Resources; Plants, Soils, and Biometeorology; Biology; Chemistry and Biochemistry; Physics; Forest Resources; Fisheries and Wildlife; and Rangeland Resources.

Water Resources Engineering prepares engineers to be lead members in water resources planning teams, often charged with coordinating the information and concept supplied from other disciplines. This need for breadth requires considerable flexibility in the arrangement of degree programs.

Water resources engineers draw principles from hydrology, fluid mechanics, hydraulics, environmental engineering, economics, ecology, political science, and other disciplines in the design and operation of projects and nonstructural methods for water resources planning and management. They need a sound understanding of how water storage, delivery, and other management systems function; of criteria used in evaluating and selecting among alternatives; of the techniques of operations research that can be used in system design; and of the institutional aspects of decision-making in the public sector.

In addition to taking core courses in the water resources engineering academic program, students are encouraged to take courses in groundwater, fluid mechanics and hydraulics, environmental engineering, and hydrology for a background in the basic principles used in water resources management. Graduate students can supplement these departmental offerings by working with their supervisory committees in choosing courses in Mathematics and Statistics; Economics; Political Science; Geology; Biological and Irrigation Engineering; Plants, Soils, and Biometeorology; Sociology, Social Work and Anthropology; Forest Resources; Rangeland Resources; Fisheries and Wildlife; and other departments.

The program combines training, research, and experience to cope with impending needs for water resources management in the United States. The department has one of the largest international water resources programs in the U.S., involving several technical assistance and training projects in Asia and Africa.

Environmental Engineering. The Division of Environmental Engineering is a multidisciplinary graduate program in the College of Engineering and is intended to enable engineers and scientists interested in the environment to obtain graduate degrees relating to potable water and waste treatment, toxic and hazardous wastes management, air quality management, natural systems engineering, and environmental impact assessment. The program provides an interdisciplinary educational approach to fundamental principles that can be applied to environmental phenomena. Research and training projects are a part of the program and provide the student with appropriate research experience leading to a thesis or dissertation.

Hazardous Waste Management. This specialization has been developed within the broader scope of the environmental engineering program to provide an integrated approach for students with a BS in engineering or natural sciences to deal with the complex issues of toxic and hazardous waste. Aspects of toxic/hazardous waste management, including characterization, treatment, disposal, control, monitoring, and environmental impacts, are dealt with in this program.

Natural Systems Engineering is the study of the interaction of engineered systems with nature, emphasizing impacts to aquatic ecosystems. Techniques include assessment of aquatic habitat through computer simulation and model verification, quantification of aquatic habitat using remote sensing systems, and data analysis and display through integrated statistical and GIS approaches. These tools are used to evaluate impacts on threatened and endangered species, habitat enhancement, instream flow assessments, fish habitat, stream sediment, and hydraulic features.

A *bioprocess engineering* program has been developed as a cooperative effort between the Division of Environmental Engineering and the Biological and Irrigation Engineering Department. This program provides students with specialized coursework and research experience in areas of bioreactor processing of environmental materials and engineering scale-up of biologically-based environmental reactions. Areas of specialization include waste to energy, fermentation, composting, and industrial waste (agricultural and chemical) reuse, recycling, and technologies based on biological processes, as well as engineering optimization of aquatic habitats.

Transportation Engineering. Transportation is a growth area

for graduate education and research. Expanding opportunities exist in many specialties of transportation engineering, including highways, transportation planning, traffic operations and safety, mass transit, and airport and seaport planning.

Goals of the program are to provide educational and research opportunities to promising students in both traditional (fundamental) and advanced-technology transportation engineering. A multidisciplinary and multimodal approach serves to strengthen the students' abilities to understand and address future transportation needs. Emphasis on computer applications and technology integration produces highly skilled and well-rounded transportation professionals.

The Transportation Division offers a wide spectrum of courses to prepare students for "real life" challenges. These include: Airport Systems, Transportation Systems Analysis, Pavement Management, and Infrastructure Planning. Safety issues and the role of Intelligent Transportation Systems (ITS) technology in improving rural transportation safety and efficiency are an integral part of the research program of the Transportation Division. Traffic network simulation models, Geographic Information Systems (GIS), expert systems software, and other computer applications are used extensively in their research studies.

Financial Assistance

Both departmental and formal grant support are available to graduate students and are awarded on a competitive basis. Students requesting financial support should apply to the department by March 15 for the coming academic year.

A number of fellowships are available through the University and the department. Teaching assistantships are available through the department and research assistantships are available through the Utah Water Research Laboratory and departmental faculty members who have ongoing projects or who hold special research grants from the University, private companies, or state and federal agencies.

Acceptance to pursue graduate studies in the Civil and Environmental Engineering Department does not guarantee the student financial assistance. Inasmuch as funds are limited, the assistantships are awarded by the department to cover specific teaching assignments and by the faculty members to provide for research as funds are available.

Civil and Environmental Engineering Courses (CEE)

1880. Civil and Environmental Engineering Orientation and Computer Applications. Orients students to programs of the Department of Civil and Environmental Engineering, professional and academic advising, student services, professional societies, and engineering careers. Laboratory activities emphasize problem solving using computer applications, such as spreadsheets and the HP48 Scientific Calculator. (1Sp)

2240. Engineering Surveying. Experience with a wide variety of common surveying equipment, including use and operation of levels, theodolites, total station equipment, and GPS. Prior to graduation, computer applications and field exercises prepare students for civil engineering employment early in their careers. (3F,Su)

2250. Cooperative Practice I. Planned work experience in industry. Detailed program must have prior approval. Written report required. Prerequisite: Preprofessional enrollment in either the Civil or Environmental Engineering program. (3F,Sp,Su)

2870. Sophomore Seminar. Supervised discussion and review of problems encountered by professional engineers. (1Sp)

2890. Environmental Engineering Sophomore Seminar. Introduces students to the field of environmental engineering, emphasizing design, ethics, and leadership in the environmental engineering profession. Emphasizes creative thinking, organizational skills, team work, professional ethics, and social responsibility. Prerequisite: Sophomore standing in environmental engineering. (1Sp)

3010. Mechanics of Materials. Includes principal stresses, combined loading and stresses, deflection of beams by direction integration, moment-area, conjugate beams and superposition, and deflection of frames and trusses by energy methods, columns, cables, and arches. Prerequisites: Engr 2000 and 2040. (3F)

3030. Uncertainty in Engineering Analysis. Principles of probability and statistics applied specifically to problems in civil and environmental engineering, including transportation, water quality, waste treatment, hydrology, and materials. (2Sp)

3080. Design of Reinforced Concrete and Wood Structures. Design of simple and continuous reinforced concrete beams and columns, beam/column joints, and one-way slab design. Design of wood and glue laminated beams, axially loaded members, connections, columns, and plywood diaphragms. Prerequisite: CEE 3010. (3Sp)

3210. Introduction to Transportation Engineering. Introduction to basic concepts of roadway geometric design, and intersection and highway capacity analysis. Other topics include: traffic flow characteristics, traffic studies, signal design, and transportation project evaluation. Prerequisite: CEE 3030. (3Sp)

3430. Engineering Hydrology. Processes and practical problems in: surface and groundwater hydrology, the hydrological cycle, rainfall-run-off and flood analysis, regional groundwater flow and well hydraulics, and the design of water supply systems. Prerequisite: CEE 3500. (3Sp)

3500. Civil and Environmental Engineering Fluid Mechanics. Explores fluid properties, hydrostatics, fluid dynamics similitude, energy and momentum principles, closed conduit flow, open channel flow, and flow measurement. Includes laboratory exercises in flow measurement, open channel flow, pipe friction, physical modeling, and data collection. Prerequisites: Math 1220; Math 2210 or 2250; Engr 2000; and CEE 3870 (must be taken concurrently). (3F,Sp)

3510. Civil and Environmental Engineering Hydraulics. Unsteady flow in open channel and closed circuits, nonuniform flow in open channels, combined energy losses in pipelines, and distribution in pipe networks. Includes laboratory and computer exercises in data collection, pipe networks, and unsteady and nonuniform flow. Prerequisites: Math 1220; Math 2210 or 2250; Engr 2200; CEE 3870 (must be taken concurrently). (2F,Sp)

3610. Environmental Management. Introduction to environmental health, emphasizing relationships among environmental quality, public health, environmental and occupational health regulations, human health risk assessment, institutions, and engineered systems in environmental health management. Prerequisites: Chem 1210; Biol 1210 or Breadth Life Sciences course. (3F)

3640. Water and Wastewater Engineering. Engineering analysis and design of processes for treatment of water and wastewater. Major topics include water quality evaluation; physical, chemical, and biological treatment systems; design of facilities for production of drinking water and for treatment and reclamation of municipal and industrial wastewater; and management of residuals from water and wastewater treatment facilities. Laboratory evaluation of physical and chemical treatment technologies. Computer applications for process modeling and analysis. Prerequisites: Chem 1210, Biol 3300, CEE 3430, 3500. (4Sp)

3670. Transport Phenomena in Bio-Environmental Systems. Core course in both biological and environmental engineering. Students develop a detailed understanding of the principles, concepts, modes, and methods of calculating heat and mass transfer. Emphasis given to contaminant and nutrient flux, along with their state transformations, in order for the biological or environmental engineer to evaluate options for production, clean-up, and control of bio-environmental systems. Prerequisite: CEE 3500. (3Sp)

3780. Solid and Hazardous Waste Management. Introduction to integrated management of municipal and industrial solid waste; household, commercial, and industrial hazardous waste; and resource recovery and recycling principles. Three lectures augmented by weekly laboratory to provide students with experience in wet laboratory, computer modeling, and field trip experiences related to modern solid and hazardous waste management principles. Prerequisite: Junior standing in environmental engineering. (4F)

3870. Professional/Technical Writing in Civil and Environmental Engineering. Gives CEE students intensive practice with oral and written communication in business and technical CEE writing. Requires concurrent enrollment in CEE 3500 and 3510. (2F)

3880. Civil Engineering Design I. Introduction to senior engineering students' integrated design experience. Design project is identified and proposal for its completion during the senior year is produced. Emphasizes project scheduling, and completion of design proposal. Prerequisite: CEE 3870. (1Sp)

3890. Environmental Engineering Design I. Introduction to senior environmental engineering students' integrated design experience. Design project identified and proposal for its completion during the senior year is produced, under mentoring of course instructor. Emphasizes project identification, project scoping, manpower and materials budgeting, project scheduling, and completion of design proposal. Prerequisites: CEE 3870 and junior standing in environmental engineering. (1Sp)

4200. Engineering Economics. Applications of the mathematics of finance to engineering decision making. Prerequisite: Senior year of engineering or instructor's consent. (2F)

4300. Engineering Soil Mechanics. Physical and mechanical properties of soils. Topics include: classification, permeability, soil stresses and settlement analysis, soil strength, slope stability, lateral earth pressures, introduction to foundations, numerical solutions, and computer applications. Prerequisite: Engr 2040. (4F)

CI 4790. Environmental Engineering Design II. Provides senior environmental engineering students with integrated design experience in two-semester sequence. Design projects proposed in CEE 3890 completed under mentoring of course instructor. Emphasizes team work, scheduling, design calculations, and completion of design report. Prerequisites: CEE 3890 and concurrent enrollment in environmental engineering technical elective course during fall semester. (2F)

CI 4870. Civil Engineering Design II. Provides senior engineering students with integrated design experience in two-semester sequence. Design projects proposed in Junior Design Proposal placed on team work, scheduling, design calculations, and completion of design report. Prerequisite: CEE 3880; senior design technical elective should be taken concurrently. (2F)

CI 4880. Civil Engineering Design III. Provides senior engineering students with integrated design experience in two-semester sequence. Design projects started in CEE 4870 will be completed with presentation, report, and defense of design project. Prerequisite: CEE 4870. (2Sp)

CI 4890. Environmental Engineering Design III. Provides senior environmental engineering students with integrated design experience in two-semester sequence. Completion of design projects begun in CEE 4790, with presentation, report, and defense. Prerequisite: CEE 4790. (2Sp)

4930. Independent Study. Laboratory design or research project on problem selected by student. Requires review of literature, preparation of proposal describing project, completion of design or research project, and preparation of report. (1-3F,Sp,Su) ®

5010. Matrix Analysis of Structures and Introduction to Finite Elements. Analysis of structures using matrix methods. Application of software based on the stiffness method to practical analysis problems. Introduction of Finite Element method based on stiffness approach and mathematical derivation of simple finite elements, along with application to practical problems. Prerequisite: CEE 3010. (3F)

5020. Finite Element Methods in Solid Mechanics I. Introduction to finite element methods and their application to the analysis and design of mechanical engineering systems. Prerequisite: MAE 3040. (3F)

5060. Mechanics of Composite Materials I. Stress-strain relations for nonisotropic composites, such as fiber-reinforced plastic laminates, properties and their uses, strength and life determination, and methods for design using composite materials. Prerequisite: MAE 3040 or CEE 3010. (3F)

5070. Structural Steel Design. Structural steel design using load and resistance factor design (LRFD) method. Focuses on design of structural beams, columns, and connections utilizing steel design codes. Prerequisite: CEE 3080. (3F)

5080 (d6080).[1] Numerical Methods in Elasticity. Elasticity theory, stress and strain analysis, and yield criteria. Governing equilibrium, kinematic, and compatibility equations. Generalized Hooke's law. Classical solutions of flex and torsion problems. Energy methods. Introduction to finite difference, finite element, and boundary element methods. Computer applications. Prerequisite: CEE 3010. (3F)

5100. Infrastructure Evaluation and Renewal. Evaluation of existing structural systems and techniques to improve their performance. Focuses on structures which are seismically deficient. Prerequisites: CEE 3080, 5070. (3Sp)

5190 (d6190). Geographic Information Systems for Civil Engineers. Introduction to GIS concepts addressing data structures, spatial entities, and queries. Topics include location referencing methods, data collection techniques, current applications, and institutional and organizational issues. (3F)

5220 (d6220). Traffic Engineering. Topics covered include characteristics, measurements, and analysis of volume, speed, density, and travel time; capacity and level of service analysis; signalization and traffic control devices. (3F)

5230 (d6230). Geometric Design of Highways. Principles of highway location and planning, with full consideration of economic, environmental, and other impacts. Capacity analysis of intersections and highways, passing-lane design, and risk-cost based horizontal and vertical alignment design. Introduction to design software through coursework and term projects. Prerequisite: CEE 3210. (3Sp)

5240 (d6240). Urban and Regional Transportation Planning. Examination of travel demand forecasting, data collection, and survey data analysis techniques. Focuses on transportation-land use interactions and impact of market-based policies on travel demand. Theories and applications of traditional and advanced trip distribution, mode choice, and route assignment models. (3Sp)

5250. Environmental Engineering Cooperative Practice. Applied environmental employment with primary focus of work experience related to one of the environmental engineering specialty areas. Prerequisites: Senior status and permission of instructor. (2F,Sp,Su)

5320. Foundation Analysis and Design. Applications of theories studied in soil mechanics. Design considerations for various foundation types, including shallow foundations, driven piles, drilled shafts, walls, soil anchorages, and mechanically-stabilized earth support systems. Field investigation techniques and computer applications. Prerequisite: CEE 4300. (3F)

5430 (d6430). Groundwater Engineering. Basics of contaminant transport and fate in soil water and vapor, design of groundwater recovery systems, and subsurface contamination remediation, including interceptor wells, well fields, stream-aquifer interactions, soil vapor extraction, separate phase recovery, biodegradation of soluble plumes, and air emissions. (3Sp)

5450 (d6450). Hydrologic Modeling. Case studies of hydrologic modeling and decision methods: (1) Real-time flood warning; (2) extended streamflow prediction; (3) probabilistic water resource management; and (4) physical modeling of ungaged basins. Prerequisite: CEE 3430. (3Sp)

5460 (d6460). Water Resources Engineering. Engineering design course covering a wide range of topics, including: surface and groundwater hydrology, statistical analysis, water law, hydroelectric power, water supply, irrigation, flood control,

wastewater, drainage, dams and reservoirs, pipelines, open channels, and planning. (3F)

5470 (d6470). Sedimentation Engineering. Explores river response, sediment transport, sediment and watershed yield, flow resistance, scour and erosion, and floodplain management. Prerequisite: CEE 3500. (3Sp)

5540 (d6540). Fluid Mechanics. Intermediate-level fluid mechanics course, including fluid properties, governing equations, and applications. Brief study of viscous flows, including laminar and turbulent flow solutions. Detailed study of potential flow, including use of complex variable analysis and numerical solutions, and two- and three-dimensional flows. (3F)

5550 (d6550). Hydraulic Design. Includes design and operation of piping systems; economics; feasibility and impact of pipelines; pipe, pump, and valve selection; transient and cavitation analysis; and pipeline operation and filling. Prerequisite: CEE 5540/6540. (3Sp)

5560 (d6560). Environmental Hydraulics. Design of hydraulic structures, spillways, energy dissipators, fish passage, reservoir operation, ocean outfalls, and pumping stations. Includes principles of design and impact of structures on the environment, and the environmental properties and hydraulics of fluids. Prerequisite: CEE 3500. (3F)

5610. Environmental Quality Analysis. Familiarizes students with various methods used for analysis of chemical parameters in environmental samples (water, soil, and air). Provides students with skills enabling them to make proper selection/evaluation of analytical procedure and evaluate data generated. Prerequisites: CEE 3610, 3640. (3F)

5620. Aquatic Chemistry. Provides students with understanding of principles of aquatic chemistry, emphasizing chemical equilibria, acid-base reactions, complex formation, oxidation-reduction reactions, complex formation, and dissolution chemistry. Prerequisites: Chem 1210, CEE 3640. (2Sp)

5680 (d6680). Soil Based Hazardous Waste Management. Engineering management of hazardous wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE 3610, 3640, 3870, CEE/BIE 3670. (3F)

5690 (d6690). Natural Systems Engineering. Application of modeling tools commonly utilized in water resources systems for assessment of environmental impacts associated with engineered systems. Topics include: water resources modeling; physical, chemical, and biological process effects; assessment methods; data integration techniques; impact assessment; and computer modeling techniques. Prerequisites: CEE/PubH 3610, CEE 3500, 3510, 3640. (3F)

5700 (d6700). Field Sampling Techniques for Natural Systems Engineering. Provides students with hands-on approach to utilizing several of the most commonly applied spatial and temporal sampling techniques for data acquisition in support of natural systems modeling. Explores standard and advanced surveying techniques for water quality, stream geomorphology, and hydraulics, utilizing levels, total stations, laser levels, GPS, and hydroacoustic technologies. Integrative sampling strategies across spatial and temporal scales emphasized for multi-disciplinary studies. Prerequisite: CEE 5690/6690. (2Sp)

5710. Pollution Prevention and Industrial Ecology. Explores pollution prevention and waste minimization concepts, focusing on implementation of these concepts in design of production processes and products. Discussion of pollution prevention/waste minimization concepts, energy and materials conservation, Life Cycle Analysis, materials and process audits, industrial process design for waste minimization and energy conservation, packaging, and ISO 14000. Prerequisites: CEE 3670, 3780, MAE 2400. (2Sp)

5730 (d6730). Analysis and Fate of Environmental Contaminants. Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Prerequisites: Chem 1210, 2300, CEE 3670. (3F)

5790. Accident and Emergency Management. Introduction to fundamentals of accident, hazard, and emergency management. Topics include legislation; chemical safety fundamentals; fire, explosion, and spill fundamentals; contaminant air transport fundamentals; hazard and risk assessment; dispersion applications; and hazard and risk management applications. Prerequisite: CEE 5860. (3Sp)

5810 (d6810). Biochemical Engineering. Fundamentals of bioreactor design and bioengineering. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

5830 (d6830). Management and Utilization of Biological Solids and Wastewater. Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

5860. Air Quality Management. Introduction to air quality management. Explores sources and effects of conventional and toxic air pollutants, control techniques, and air dispersion modeling. Three lectures augmented by weekly laboratory, providing students with experience in wet laboratory, computer modeling, and field trip experiences related to conventional and toxic air pollution management principles. Prerequisites: CEE 3640, 3670, 3780, MAE 2400. (4F)

5870. Hazardous Waste Incineration. Provides introduction to hazardous waste incineration principles. Topics include: thermodynamics, stoichiometry, thermochemistry, chemical kinetics, energy recovery, pollution control systems, and incinerator design principles. Prerequisites: CEE 3670, 3780, MAE 2400; CEE 5860 (may be taken concurrently). (2Sp)

5880. Remediation Engineering. Physical, chemical, and biological principles associated with remediation of hazardous waste contaminated soil, water, sediments, and air. Topics include: source removal and source control, product recovery, chemical treatment methods, biological remediation concepts, in situ processes, ex situ processes, and integrated process design. Prerequisites: CEE 3430, 3640, 3780, CEE/PubH 3610. (3F)

5900. Cooperative Practice II. A planned work experience in industry. Detailed program must have prior approval. Written report required. (3F,Sp,Su)

6010. Finite Element Methods in Solid Mechanics II. Advanced theory and applications of finite element methods to both static and dynamic solid mechanics problems. Prerequisite: MAE 5020. (3Sp)

****6020. Structural Stability.** Elastic and inelastic buckling of columns; analysis of beam columns, thin-walled beams of open cross-section. Stability analysis of frame and plate structures. Large deflection theory. Historical notes on stability of structures. Computer applications. Prerequisite: CEE 3010. (3F)

***6030. Structural Optimization.** Introduction to optimization techniques for linear and nonlinear, univariable, and multivariable functions with or without constraints. Computer applications, and applications to structural design. Prerequisite: CEE 3010 or instructor's consent. (3Sp)

***6040. Structural Reliability.** Elements of probability theory and its application to structural engineering and mechanics. Statistical distribution of loads. Uncertainties in material parameters and their effects in design. Reliability-based safety analysis and computer applications. Prerequisite: Instructor's consent. (3F)

****6050. Experimental Methods in Structural Engineering.** Experimental techniques used in research and design in structural engineering and mechanics. Structural models. Theory and practical applications. Development of principles used to design research projects. Prerequisite: Instructor's consent. (3Sp)

6070. Mechanics of Composite Materials II. Second course in composite materials. Stress-strain states of laminated composite structures, including interlaminar stresses, failure criteria, and hygrothermal stresses. Prerequisite: MAE 5060. (3Sp)

6080 (d5080). Numerical Methods in Elasticity. Elasticity theory, stress and strain analysis, and yield criteria. Governing equilibrium, kinematic, and compatibility equations. Generalized Hooke's law. Classical solutions of flex and torsion problems. Energy methods. Introduction to finite difference, finite element, and boundary element methods. Computer applications. Prerequisite: CEE 3010. (3F)

6130. Structural Dynamics and Seismic Design. Development and solutions for equations of motion for single- and multi-degree of freedom systems. Dynamic analysis by Modal Superposition and Response Spectra. Design of structures for seismically active areas. (3Sp)

6180. Dynamics and Vibrations. Fundamentals of two-dimensional and three-dimensional rigid body dynamics, including Newtonian, Lagrangian, and Leavit Energy Methods. Equations of motion, mode shapes, and natural frequencies for continuous media and multi degree-of-freedom systems. Prerequisite: MAE 5300 or CEE 6130. (3F)

6190 (d5190). Geographic Information Systems for Civil Engineers. Introduction to GIS concepts addressing data structures, spatial entities, and queries. Topics include location referencing methods, data collection techniques, current applications, and institutional and organizational issues. (3F)

6200. Pavement Design. Analysis and design of flexible and rigid pavements for highways and runways, including the design of overlays. Equal emphasis on current practice and advanced concepts of pavement management. Prerequisite: CEE 3010. (3F)

6210. Transportation Systems Analysis. Introduces systems approach to analysis of transportation services and infrastructure. Focuses on basic and advanced concepts, including operations research techniques, simulation, and artificial intelligence. Topics include facility sizing and location, financial and economic analysis of investment projects, and privatization. Prerequisite: CEE 3030 or equivalent. (3F)

6220 (d5220). Traffic Engineering. Topics covered include characteristics, measurements, and analysis of volume, speed, density, and travel time; capacity and level of service analysis; signalization and traffic control devices. (3F)

6230 (d5230). Geometric Design of Highways. Principles of highway location and planning, with full consideration of economic, environmental, and other impacts. Capacity analysis of intersections and highways, passing-lane design, and risk-cost based horizontal and vertical alignment design. Introduction to design software through coursework and term projects. Prerequisite: CEE 3210. (3Sp)

6240 (d5240). Urban and Regional Transportation Planning. Examination of travel demand forecasting, data collection, and survey data analysis techniques. Focuses on transportation-land use interactions and impact of market-based policies on travel demand. Theories and applications of traditional and advanced trip distribution, mode choice, and route assignment models. (3sp)

6250. Transportation Safety. Methodologies for analyzing transportation safety and designing countermeasures. Accident prediction models and evaluation of safety improvement projects. Prerequisite: CEE 3210 or equivalent. (3Sp)

6260. Public Transportation. Principles of planning, design, and operation of transit systems in urban and rural areas. Determination of optimal route alignments, schedules, and station/stop spacings. Exploration of innovations in financing and pricing, including cost-cutting techniques. (3Sp)

6270. Traffic Flow Theory. Introduces macroscopic and microscopic models of traffic flow, shock wave analysis, and queuing systems. (3Sp)

6300. Earth Structures. Design and construction of earth and rockfill dams, embankments, excavations, and retaining structures. Prerequisites: CEE 4300, 5320. (3F)

6310. Environmental Geotechniques. Geotechnical aspects of environmental systems, with concentration on waste containment facilities. Prrequisite: CEE 4300. (3F)

6320. Deep and Shallow Foundations. Analysis, design, and construction of deep and shallow foundations. Prerequisites: CEE 4300, 5320. (3Sp)

6330. Ground Reinforcement, Improvement, and Treatment. Theory, design, and construction methods for ground reinforcement, improvement, and treatment applications. Prerequisites: CEE 4300, 5320. (3F)

6340. Laboratory and Field Methods in Geotechnical Engineering. Subsurface investigation, field testing and instrumentation, and laboratory testing. Prerequisites: CEE 4300, 5320. (2F)

6360. Geotechnical Principles. Theoretical topics in shear strength, lateral pressure slope stability, bearing capacity, consolidation, and settlement analysis. Prerequisites: CEE 4300, 5320. (3Sp)

6370. Buried Structures. Analysis of structural performance of buried structures (pipes, tanks, silos, etc.) using principles of mechanics of materials and finite element methods. Prerequisite: CEE 4300. (2F)

6380. Earthquake Engineering. Covers wide variety of earthquake engineering topics, including seismology and earthquake source characterization, strong ground motion, seismic hazard analysis, wave propagation, soil dynamics, ground response, local site effects, liquefaction, seismic slope stability, soil improvement, vibrational analyses, and structural seismic design. Prerequisite: CEE 4300. (3Sp)

6400. Physical Hydrology. Fundamentals of hydrologic cycle and hydrologic processes. Precipitation, infiltration, runoff generation, evaporation and transpiration, and snowmelt. Representation of hydrologic processes in hydrologic models. Prerequisite: CEE 3430. (3F)

6410. Water Resource Systems Analysis. Systems formulation of decision problems. Solution by simulation and optimization, constrained and unconstrained optimization algorithms, case studies and applications to water supply, and quality and ecosystems management. (3Sp)

6420. Engineering Risk Assessment and Risk Management. Comprises both quantitative risk assessment techniques and a range of issues in risk management. Examples drawn from various civil engineering subdisciplines such as: environmental engineering, geotechnical engineering, hydraulics and hydrology, structural engineering, transportation engineering, and water resource management. (3Sp)

6430 (d5430). Groundwater Engineering. Basics of contaminant transport and fate in soil water and vapor, design of groundwater recovery systems, and subsurface contamination remediation, including interceptor wells, well fields, stream-aquifer interactions, soil vapor extraction, separate phase recovery, biodegradation of soluble plumes, and air emissions. (3Sp)

6450 (d5450). Hydrologic Modeling. Case studies of hydrologic modeling and decision methods: (1) Real-time flood warning; (2) extended streamflow prediction; (3) probabilistic water resource management; and (4) physical modeling of ungaged basins. Prerequisite: CEE 3430. (3Sp)

6460 (d5460). Water Resources Engineering. Engineering design course covering a wide range of topics, including: surface and groundwater hydrology, statistical analysis, water law, hydroelectric power, water supply, irrigation, flood control, wastewater, drainage, dams and reservoirs, pipelines, open channels, and planning. (3F)

6470 (d5470). Sedimentation Engineering. Explores river response, sediment transport, sediment and watershed yield, flow resistance, scour and erosion, and floodplain management. Prerequisite: CEE 3500. (3Sp)

6480. Subsurface Flow and Transport Processes. In-depth coverage of unsaturated and saturated water flow, well hydraulics, salt water intrusion, and multiphase flow applicable to groundwater resources management and remediation. Includes basics of nonreactive and reactive mass transort processes due to various pollution events, and remediation strategies. Addresses special topics related to free-product recovery and

migration, and vapor phase transport as applicable to remediation of hazardous-waste contaminated subsurface. (3F)

6490. Analysis of Water Resources Institutions. Reviews fundamental building blocks of water resource institutions, emphasizing creation of institutions which are sensitive to a particular culture, economic, and political environment. Addresses institutional mission and regulatory roles, public participation, property and water rights, and elements of production. (3Sp)

6500. Open Channel Hydraulics with an Emphasis on Gradually Varied Flow. Theory and applications of steady uniform and gradually varied flow under both subcritical and supercritical flow conditions. Solutions to multiple-network canal systems by solving systems of combined ordinary differential and algebraic equations. Method for defining natural channel systems and solving steady-state flows in them. Prerequisites: CEE 3500, 3510. (3F)

6510. Numerical and Statistical Methods for Civil Engineers. Engineering applications of approximation and interpolation, solution methods for ordinary differential equations, numerical solution of partial differential equations, nonparametric and parametric probability and regression estimation, and Monte Carlo and uncertainty analysis. (3F)

6520. Applied Hydraulics. Basic fluid mechanics applied to wildland watershed systems and directed at nonengineering students. Explores nature of fluid state, fluid motion, and steady uniform and varied flow in open channels, under both subcritical and supercritical conditions. Surveys concepts of boundary layers, turbulence, convection, dispersal, and wave formation in unsteady flows. Emphasizes problem formulation and solving. Prerequisites: WS/RLR 4490; Math 2280 (recommended). (3F)

6530. Unsteady Flows in Open Channels and Numerical Solutions of St. Venant Equations. Derivation and physical meaning of the St. Venant equations, types of water waves, solutions to unsteady free surface flows based on the characteristics, and direct and iterative implicit methods of solution. Emphasizes solving unsteady flow problems in channel systems. Prerequisite: CEE 6500. (3Sp)

6540 (d5540). Fluid Mechanics. Intermediate-level fluid mechanics course, including fluid properties, governing equations, and applications. Brief study of viscous flows, including laminar and turbulent flow solutions. Detailed study of potential flow, including use of complex variable analysis and numerical solutions, and two- and three-dimensional flows. (3F)

6550 (d5550). Hydraulic Design. Includes design and operation of piping systems; economics; feasibility and impact of pipelines; pipe, pump, and valve selection; transient and cavitation analysis; and pipeline operation and filling. Prerequisite: CEE 6540/5540. (3Sp)

6560 (d5560). Environmental Hydraulics. Design of hydraulic structures, spillways, energy dissipators, fish passage, reservoir operation, ocean outfalls, and pumping stations. Includes principles of design and impact of structures on the environment, and the environmental properties and hydraulics of fluids. Prerequisite: CEE 3500. (3F)

***6570. Potential Fluid Flow.** Application of the principles and methods of classical hydrodynamics to the solution of problems. Closed form solution to invisual fluid flows obtained using complex variables and conformal mappings. Prerequisite: CEE 3510 or MAE 3420. (2F)

6600. Environmental Chemistry of Inorganic Contaminants. Inorganics of environmental concern discussed in terms of processes affecting their behavior in soil and water systems. Laboratory-scale experiments and computer models used to evaluate this behavior. Explores remediation of environmental systems contaminated with inorganic pollutants. Prerequisite: CEE 5620. (3F)

6630. Process Dynamics in Environmental Engineering Systems. Fundamental principles used in analysis and simulation of environmental systems. Emphasizes reaction kinetics, mass transfer, reactor analysis and design, and development and solution of mathematical models to describe natural and engineered environmental systems. Prerequisites: CEE 3500, 3510, 3640, 3670. (3F)

6640. Physical and Chemical Environmental Process Engineering. Principles of physical and chemical environmental engineering processes, including sedimentation, filtration, gas transfer, aeration, absorption, ion exchange, membrane processes, coagulation, flooculation, precipitation, oxidation, reduction, and disinfection. Laboratory testing to demonstrate process engineering principles. Process modeling and analysis applications in treatment of water, wastewater, industrial wastes, vapor treatment, and soil remediation. Prerequisites: CEE 5620, 6630. (4Sp)

6650. Biological Processes in Environmental Engineering. Theory and design of biological processes used in environmental engineering. Stoichiometric, energetic, and kinetic analysis of biological treatment processes; modeling and design of suspended growth and fixed-film processes for treatment of municipal, industrial, and hazardous wastes; nutrient removal; and bioremediation. Operation of bench-scale bioreactors. Prerequisites: CEE 5810, 6630, 6640. (3F)

6680 (d5680). Soil Based Hazardous Waste Management. Engineering management of hazardous wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE 3610, 3640, 3870, CEE/BIE 3670. (3F)

6690 (d5690). Natural Systems Engineering. Application of modeling tools commonly utilized in water resources systems for assessment of environmental impacts associated with engineered systems. Topics include: water resources modeling; physical, chemical, and biological process effects; assessment methods; data integration techniques; impact assessment; and computer modeling techniques. Prerequisites: CEE/PubH 3610, CEE 3500, 3510, 3640. (3F)

6700 (d5700). Field Sampling Techniques for Natural Systems Engineering. Provides students with hands-on approach to utilizing several of the most commonly applied spatial and temporal sampling techniques for data acquisition in support of natural systems modeling. Explores standard and advanced surveying techniques for water quality, stream geomorphology, and hydraulics, utilizing levels, total stations, laser levels, GPS, and hydroacoustic technologies. Integrative sampling strategies across spatial and temporal scales emphasized for multi-disciplinary studies. Prerequisite: CEE 6690/5690. (2Sp)

6710. Environmental Engineering Microbial Ecology. Principles of microbial ecology applied to engineered and natural systems. Environmental management and general microbiology. Prerequisites: Biol 3300, CEE/PubH 3610. (3F)

6720. Natural Systems Modeling. Provides hands-on approach to utilizing several of the most commonly applied modeling tools employed to estimate physical, chemical, and biological impacts of existing and proposed water resource systems. Focuses on utility and limitation of specific modeling approaches, while also stressing integrative multi-disciplinary nature of impact assessment frameworks. Prerequisite: CEE 6690/5690. (3Sp)

6730 (d5730). Analysis and Fate of Environmental Contaminants. Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Prerequisites: Chem 1210, 2300, CEE 3670. (3F)

6740. Environmental Quality Modeling. Development and application of mathematical models for conventional and toxic pollutants in environmental systems. Description of advection, dispersion, sediment transport, partitioning, interphase transfer, and transformation kinetics applied to organic and inorganic pollutants. Equilibrium, steady state, and nonsteady systems. Prerequisite: CEE 6630. (3Sp)

6750. Eco-Hydraulics for Natural Systems Engineering. Provides students with advanced multi-disciplinary modeling course in the application of hydraulics and water resource modeling in light of impact assessment frameworks for natural systems modeling. Focuses on application on one-dimensional and two-dimensional hydraulic modeling as basis for examining quantitative impacts on stream and riparian ecosystems under altered flow, as well as channel conditions with particular emphasis on fish and aquatic macro-invertebrates. Prerequisite: CEE 6690/5690. (4F)

6810 (d5810). Biochemical Engineering. Fundamentals of bioreactor design and bioengineering. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

6830 (d5830). Management and Utilization of Biological Solids and Wastewater. Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE 3610, 3640. (3F)

6840. Application of Technology Transfer for Teachers. Focuses on application of modern instructional strategies to the transfer of technology and science to the public education setting. Part of a series of six courses. Prerequisite: Participation in an In*Step Science Program in the public schools. (2F,Sp,Su) ®

6900. Directed Reading. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

6930. Special Problems. Independent or group study of engineering problems not covered in regular course offerings. Prerequisite: Instructor's consent. (1-4F,Sp,Su) ®

6970. Thesis Research. Prerequisite: Instructor's consent. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. Prerequisite: Instructor's consent. (1-9F,Sp,Su) ®

7050. Plasticity. Analysis of stresses, deformation, and collapse in devices constructed of plastic material. Prerequisite: MAE 6040 or CEE 6080/5080 or instructor's consent. (3Sp)

7080. Plate and Shell Theory. Introduction to plate and shell theories through analogy to beams and arches. Development of bending and buckling theories of plates and shells through elasticity theory. Analysis of various plates and shells by classical and numerical methods. Computer applications. Prerequisite: CEE 3010. (3F)

****7110. Constitutive Modeling and Structural Response of Engineering Materials.** Constitutive modeling of reinforced concrete, metals, soils, and composite materials. Plasticity and endochronic theories. Finite element modeling and predictive analysis of two- and three-dimensional structures. Computer applications and implementations. Prerequisite: Instructor's consent. (3F)

7120. Advanced Topics in Civil Engineering. Discussion of current research topics conducted by civil and other engineering faculty and staff at USU and elsewhere. Offered on either arranged or regular basis. Topics and times can be arranged with instructor and adviser. Prerequisite: Instructor's consent. (3F,Sp,Su)

7200. Planning and Design of Airports. Aspects of airport location, financing, and marketing. Introduces demand forecasting techniques, airside and landside capacity analysis, and facility sizing techniques. Design of terminal building components, configuration, layout of concessions, and signing. Discussion of surface access issues and environmental aspects of airport development. Prerequisite: CEE 6240/5240. (3Sp)

7300. Theoretical Soil Mechanics. Advanced studies of stress distribution in soil masses, shear strength, consolidation, constitutive modeling, and finite applications. Prerequisite: CEE 6360. (3Sp)

****7310. Fundamentals of Soil Behavior.** The influence of clay mineralogy, clay chemistry, and soil origin on the engineering properties of soil. Prerequisite: CEE 6360. (3F)

****7320. Advanced Soil Dynamics.** Advanced studies in the response of soil structures and foundations to dynamic loads. Prerequisite: CEE 6360. (3F)

7430. Stochastic Hydrology. Stochastic description of hydrologic variability in time, space, and space-time. Markov processes, time series synthesis and forecasting, spectral analysis, spatial interpolation and random field simulation, data imputation, and parameter estimation for physical models. Lattice and Markov chain Monte Carlo methods, simulated annealing, and Gibbs processes. Applications to rainfall, streamflow, groundwater quality and quantity, and subsurface characterization. (3Sp)

7440. Hydroclimatology. Study of droughts and floods as determined by long-term climate fluctuations. Dynamics of low-frequency large-scale climate variability. El Nino Southern Oscillation and its hydrologic impacts. Global climate change issues. (3Sp)

7460. Advanced Topics in Hydrology. Topics of prominent current interest for advanced MS and PhD students. Can be repeated for credit with consent of instructor. (3Sp) ®

7470. Advanced Subsurface Hydrology. Subsurface flow and transport modeling, including objectives, problem formulation, model selection, calibration, and boundary conditions. Applied stochastic subsurface hydrology, including major findings, uncertainty estimation, and risk-based design. (3Sp)

7520. Mathematical Methods for Civil and Environmental Engineers. Applications of advanced mathematical methods to analyze civil and environmental engineering problems, including analysis of dynamical systems, solutions to nonlinear and stochastic differential equations, Fourier analysis, and neural networks. (3Sp)

7530. Environmental Fluid Mechanics. Advanced fluid mechanics course emphasizing diffusion and dispersion processes in moving fluids, including Fickian diffusion, dispersion in laminar and turbulent flows, and dispersion in rivers. Practical applications of measurements and modeling. (3Sp)

7580. Advanced Finite Element Analysis in Fluid Mechanics. Application of the finite element method of analysis to problems in fluid mechanics. Use of higher order element to two- and three-dimensional flows. Prerequisites: CEE 3510, 6570; or MAE 3420, 5020. (3Sp)

7970. Dissertation Research. Prerequisite: Instructor's consent. (1-10F,Sp,Su) ®

7990. Continuing Graduate Advisement. Prerequisite: Instructor's consent. (1-9F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of

Communication

College of Humanities, Arts & Social Sciences

Head: Professor *Edward C. Pease,* journalism, media criticism
Office in Animal Science 310, (435) 797-3292

Associate Head: Associate Professor *Penny M. Byrne,* broadcasting

Graduate Program Co-coordinators: Associate Professor *James O. Derry,* international mass communication development; **Assistant Professor** *Michael S. Sweeney,* print journalism, media history

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Associate Professor *Scott A. Chisholm,* media management, literary journalism; **Assistant Professors** *Brenda Cooper,* director of Women's Studies Program, gender and mass media; *Nancy M. Williams,* print journalism, Internet; **Adjunct Professor** *Alan M. Hofmeister,* video, new media; **Temporary Instructor** *Dale Cressman,* broadcasting; **Adjunct Instructors** *James Thalman,* print journalism, reporting; *Tim Vitale,* print journalism

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Journalism; Master of Science (MS) and Master of Arts (MA) in Communication

Undergraduate emphases: Broadcast/Electronic Media, Media Studies, Print Journalism, Public Relations/Corporate Communications; **Graduate specializations:** Media Management; Print, Photo, and Broadcast Journalism

Undergraduate Programs

Objectives

The undergraduate major in the Communication Department, leading to the Bachelor of Arts or the Bachelor of Science degree in Journalism, is designed to prepare students for careers in a wide range of communication fields, through instruction in the philosophical groundings, theoretical perspectives, and hands-on applications of communications skills and practice. The curriculum integrates practical mass communications skills training with critical thinking skills, while helping students to understand the processes and effects of communication, as well as the relationships, roles, and interactions of mass communication with other social institutions.

With individual student objectives in mind, the Department of Communication offers a flexible program of study having the following goals:

1. Provide students with theoretical and practical understanding of the workings of mass communication principles and practice.
2. Provide students with abilities and practical skills required to work in communications professions.
3. Provide students with a grounding in the philosophical, ethical, and legal frameworks of mass communication, as well as an understanding of the roles and responsibilities of mass communication in a democratic society.
4. Develop in students critical thinking and analytical abilities, facility in social science research methods, and strong written and oral communication skills, within a broad liberal arts context.

The Department of Communication maintains state-of-the-art studios and labs, designed to train students in various communications and journalism skills. These include the multimedia computer newsroom, a video preproduction studio, a full TV studio, and a photographic darkroom. Students receive instruction in traditional journalistic basics, such as writing, information-gathering, reporting, and video production; in new technologies of on-line information gathering; and in critical skills of media literacy.

Requirements

Course Requirements. Journalism majors must complete a minimum of 30 credits and a maximum of 36 credits in Communication courses, while pursuing one of the four concentration course sequences outlined below. Of the 126 semester credits required for graduation from Utah State University, Journalism majors must take at least 90 credits outside the major, including 65 credits from departments within the College of Humanities, Arts and Social Sciences. Beyond the 126 credits needed for graduation, students may take as many Communication courses as they like. In addition, majors must complete a minor/cognate area outside of the Communication Department, selected with the approval of an adviser, and a minimum of 18 credits from the department's list of approved *Breadth Requirements*, which includes courses in disciplines outside the major.

Therefore, the basic Journalism course of study is as follows: Communication courses, 30-36 credits; University Studies (General Education) courses, 30 credits; courses in the minor/cognate area, 18 credits; breadth requirements, 18 credits; electives from outside the Communication Department, 24 credits; **Total Credits, 126**.

Major Status. Students may apply for major status upon completion of a minimum of 60 semester credits, including the Journalism Premajor Core requirements, while maintaining a 2.5 cumulative GPA. Students may declare themselves as Journalism Premajors at any time after their admission to the University. Majors must maintain a minimum 2.5 overall GPA, and must earn at least a *C+* in all Communication courses, in order to remain in good standing. Students whose GPA drops below 2.5 will be placed on probation and may be dropped from the major if grades do not improve within one semester. No Communication class may be repeated more than once. All courses in the major must be taken for a grade (not *Pass-Fail*). Courses must be taken in sequence.

Students transferring from other institutions may be accepted into the major if they fulfill these requirements. Up to 9 transferred semester credits may count toward the major, if approved by an adviser.

Prerequisites. Courses outside the major which must be completed prior to beginning any Communication coursework are as follows: Engl 1010, 1120, Hist 2700, 2710, PolS 1100, and Soc 1010.

Premajor Core Requirements (9 credits). The following courses are required for all majors, and must be completed prior to application for major status: Comm 1000, 1110, and 2000. These courses must be taken in sequence. Prior to taking Comm 1110, students must complete Comm 1000 with a *C+* or higher, and must complete Engl 1010, a language proficiency test, and a typing test. Prior to taking Comm 2000, students must complete Comm 1000 with a *C+* or higher.

Major Requirements (6 credits). The following courses are required for all majors after acceptance into the department: Comm 2110, 4000, and 4030. Premajor core and individual course prerequisites must be taken prior to taking these courses. Prior to taking Comm 2110, students must complete Comm 1110 with a grade of *C+* or higher. Senior standing is required for enrollment in Comm 4000. Junior standing or permission of the instructor is required for enrollment in Comm 4030.

Concentration Area. Each student must select one of the following concentration areas: Broadcast and Electronic Media (12 credits); Media Studies (15 credits); Print Journalism (9 credits); or Public Relations/Corporate Communications (18 credits).

Other Communications Electives. In addition to the Premajor, major, and concentration area courses listed above, students must select additional electives from courses in the Department of Communication, to ensure a total of 30-36 credits completed in the Communication Department.

Journalism Minor

Students may select a minor of 20 credits in Communication courses, including at least 9 credits in upper-division courses, with adviser approval. All minors must take Comm 1110 and 2110. GPA requirements are the same as those required for majors.

Financial Support

In addition to general scholarships and other financial support opportunities available through the University and the College of Humanities, Arts and Social Sciences, the Department of Communication awards various scholarships to juniors, seniors, and graduate students. For a listing of scholarships, deadlines, and application requirements, contact the Department of Communication. In addition, many professional paid and unpaid internships are available through the department.

Careers in Communication

Journalism majors often begin their careers in various media professions, such as newspapers, radio and TV broadcasting, and public relations, many serving as interns while still attending school. Upon graduation, they land jobs in a variety of capacities for both journalism businesses and other industries requiring workers with excellent communication and problem-solving skills. In recent years, USU journalism students have routinely swept state, regional, and national competitions in print and video journalism, multimedia and new technologies, and, increasingly, public relations.

This success translates into an excellent reputation for USU students among businesses hiring USU students as interns and hiring USU graduates for professional positions. Jobs held by recent graduates include newspaper and magazine reporter, photographer, graphic artist, and editor; radio and television reporter, anchor, and producer; public relations director and account executive; multimedia software designer for HTML, web pages, CD-ROMs, etc.; and public information officer for politicians, legislative and lobbying groups, sports teams, and colleges, as well as for environmental organizations and other groups in the business and public sectors. Training and expertise in communication, including writing and reporting, visual literacy, publication layout and design, computer graphics, and on-line applications, prove to be valuable add-on skills for graduates entering a variety of occupations or going on to graduate school and law school.

In addition to these kinds of opportunities enjoyed by undergraduates, master's degree graduates often return to communication careers in new capacities, or teach at the community college level in journalism and communication departments.

Additional Information

For further information about publications, curriculum, faculty, and other program offerings, including USU's state-of-the-art TV studio facilities, weekly newscasts and TV programs, and the Media and Society Lecture Series, check out the Communication Department's national award-winning website, COMcon: the USU COMmunication CONnection, at http://www.usu.edu/~communic/.

Graduate Programs

The Master of Science (MS) and the Master of Arts (MA) degrees in Communication combine professional practice and theoretical training, and are designed to fit individual student needs. Students may specialize in broadcast/electronic journalism,

media criticism, public relations/corporate communications, or print journalism. Application to the graduate program is made through the USU School of Graduate Studies.

Objectives

The master's program in Communication at Utah State University offers a two-track approach to graduate study, designed for the maximum individual flexibility in pursuit of the student's goals.

The Plan A, also known as the “Thesis Option” or “Media Research,” is a course of study designed for students considering or planning to go on to a doctoral program. The Plan A option requires more coursework in theory and methodology, as well as in research tools, in order to provide grounding for advanced study at the PhD level, whether in communication or another discipline. This option also requires completion of a master's thesis, consisting of original research.

The Plan B, also known as the “Professional Option” or “Media Practice,” is designed for students seeking the master's degree as a terminal degree, and planning to go from USU into the mass media professions, or into a teaching position at the junior college level. Typically, Plan B students are mid-career media professionals seeking retooling, refreshers, or credentials for community college teaching. The Plan B option requires a professional project, approved by a major professor, in place of the research thesis.

In either case, graduate students in Communication work closely with advisers throughout their programs to design coursework and a research or professional activity agenda, along with appropriate study in a cognate area outside of Communication, that will permit them to achieve their individual goals, within the core framework of Communication coursework, whether they include professional training or additional doctoral work.

Admission Requirements

For admission to the graduate program in Communication, all students must complete the department's English Language Proficiency Examination, and must complete or demonstrate competency in the following Communication foundation courses: Comm 1110, 3110, 4020, and 4030. Competency may be demonstrated through previous coursework or experience, and one or more of these requirements may be waived with permission of the graduate program coordinator. These credits do not count toward the graduate degree. In addition, other undergraduate courses may be required.

Degree Requirements

Students may elect either the Plan A (thesis) or the Plan B (professional) option to fulfill the degree requirements of 30 semester credits as outlined below. Plan A is intended for students planning to continue graduate study, to teach, or to enter professions requiring research skills. Plan B is intended for students seeking a terminal professional degree. Selection of either the Plan A or Plan B option must be made in consultation with the student's adviser and filed with the graduate coordinator by the end of the first semester of study.

All students must complete core requirements in either plan. Students must, in consultation with their adviser, select an appropriate research tools class in research methods; the course need not be taught by the Communication Department. To remain in good standing, all students must fulfill Graduate School requirements.

Plan A: Media Research

Core Requirements (18 credits). All students must complete the following courses: Comm 6000 (3 cr.), 6020 (3 cr.), 6400 (3 cr.), and 6600 (6 cr.). In addition, students must select an appropriate 3-credit Research Tools course (from any department), providing methodological training most appropriate for the student, in consultation with their adviser.

Communication Electives (6 credits). Students must select two of the following courses: Comm 6010, 6030, 6040, 6050, 6410, and 6420.

Cognate Area (6 credits). With adviser permission, students may include additional Communication electives.

Plan B: Media Practice

Core Requirements (18 credits). All students must complete the following courses: Comm 6000 (3 cr.), 6020 (3 cr.), 6400 (3 cr.), and 6500 (3 cr.). In addition, students must select an appropriate 3-credit Research and Practice course, in consultation with their adviser. A Research Tools course (from any department), providing methodological training most appropriate for the student, must also be selected in consultation with the adviser.

Communication Electives (6 credits). Students must elect either *Option 1* or *Option 2*, as described below:

Option 1. Select two courses from the following: Comm 6010, 6030, 6050, 6110, 6300, 6310, 6320, and 6420.

Option 2. Select one course from the following: Comm 6010, 6030, 6050, 6110, 6300, 6310, 6320, and 6420. Also, select one course from the following: Comm 6210, 6220, and 6230 (other courses may be substituted for these, with adviser approval).

Cognate Area (9 credits). With adviser permission, students may include additional Communication electives.

Additional Information

For more information about graduate studies in the Department of Communication, contact the Graduate School or the Department of Communication. Also, check out the departmental web page at http://www.usu.edu/~communic/.

Communication Courses (Comm)

BSS 1000. Introduction to Mass Communication. History, philosophy, structures, and functions of the mass media (newspapers, magazines, TV and radio, advertising, and public relations) and their intersection with other social institutions. Media economics and the impacts of new technologies on media institutions and society. (3F,Sp,Su)

1010. Introduction to Women's Studies. Survey course covering fundamentals of women's studies. Explores women's diverse experiences, perspectives, and contributions to society and its institutions. Examines cultural beliefs and stereotypes concerning women's roles in society. Reviews feminist theory, socialization, ideology, and history of women's movement. (3F)

1110. Beginning Newswriting for the Mass Media. Techniques of writing news for various media. News values, philosophy, and practice. Elementary news-gathering and interviewing skills. Practice in various newswriting forms. Structures of the news

industries and work place. Prerequisites: Engl 1010 or equivalent, minimum grade of *C+* in Comm 1000, English Proficiency Test, and typing test. (3F,Sp,Su)

1200. Introduction to Video Media. Introduction to the theories and practice of video production and functions in broadcasting and the electronic mass media, including concepts, techniques, and impacts of various video approaches. Prerequisite: Minimum grade of *C+* in Comm 1000. (3F)

1300. Introduction to Public Relations. Survey of theories and practice of public relations in a variety of business, corporate, governmental, and nonprofit organizational settings. Elements of promoting organizational messages and communicating with various publics. (3F,Sp)

BSS 2000. Media Smarts: Making Sense of the Information Age. Critical analysis of the roles and performance of mass media content and messages, and their influence on society. Emphasizes critical reading of news, entertainment, and advertising content regarding women, minorities, children, and other groups. Basic mass media ethics and law. (3F,Sp,Su)

2080. Introductory Communication Internship. Lower-division, on-line internship for sophomores exploring media-related work experiences. Permission of department head required. (1-2F,Sp,Su)

2110. Introduction to On-line Journalism. Use of interactive computer networks, databases, and other electronic resources for news reporting and writing. Practice in research and information evaluation for news stories and features in news and public relations contexts. Prerequisite: Minimum grade of *C+* in Comm 1110. (2F,Sp)

2120. Reporting Public Affairs. Theory and practice of reporting public affairs, community news, and features. Emphasizes advanced news gathering techniques, understanding local political structures, news and feature writing skills, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C+* in Comm 1110 and 2110. (3F,Sp)

2150. Beginning Photojournalism. Theory and practice of photojournalism. Roles and functions of photographic images in the news media, both print and electronic. Practice in use of cameras and in darkroom techniques. Students furnish cameras and some materials. Prerequisite: Art 2800 or permission of instructor. (3F,Sp)

2210. Writing for Electronic Media. Theory and practice of reporting public affairs for broadcast and electronic media. Emphasizes news gathering, understanding local political structures, news and feature writing, commercial and continuity writing, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C+* in Comm 1110, 1200, and 2110. (3F,Sp)

2310. Writing for Public Relations. Theory and practice of information-gathering for public relations, including basic news releases, features, speeches, annual reports, newsletters and brochures, broadcasting, and other forms. Emphasizes advanced news gathering techniques, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C+* in Comm 1110, 1300, and 2110. (3F,Sp)

3010. Communication Research Methods. Analysis of communication theories and their application in research settings. Basics of communication research methods and analysis of research results in mass media and public relations contexts. (3F,Sp)

3110. Beyond the Inverted Pyramid. Theory and practice of longer literary forms for newspapers and magazines. Feature writing, investigative and interpretive journalism, emphasizing advanced information-gathering and writing skills, analysis of audiences, and markets. Prerequisite: Minimum grade of *C+* in Comm 2120 or permission of instructor. (3Sp)

3120. Copy Editing. Language use and editing of news stories for the mass media, including language, grammar, publication style, story editing for focus and content, headline and caption writing, and news judgment. Publication design, use of graphics, and page layout. Prerequisite: Minimum grade of *C+* in Comm 2120. (3F,Sp)

3130. Publication Layout and Design. Application of principles of typography, page layout, and publication design to a variety of print products, including newspapers, magazines, newsletters, and brochures. Integration and use of text, graphics, and photography for optimum communication effectiveness. Prerequisite: Minimum grade of *C+* in Comm 2120. (3Sp)

DSS 3140. Opinion Writing. Study and practice of persuasive editorial and opinion writing for the mass media. (3F,Sp)

3150. School Publications. Problems and practice of advising staffs of school publications, including student newspapers, magazines, and yearbooks. (2Su)

3210. Corporate Video. Project-based lab work in studio video productions for real-world clients. Use of video field equipment and production facilities. Completion of video packages. Prerequisite: Minimum grade of *C+* in Comm 2210. (3F,Sp)

DSS 3300. Corporate Communications. Theory and practice of communication processes and techniques to connect both internal and external constituencies in business and organizational settings. Emphasizes communication theories and measurement of effectiveness of various strategies. Prerequisites: Comm 1300, 2310. (3F,Sp)

DSS 3310. Persuasion, Public Opinion, and Propaganda. Theory and impact of mass media on public opinion through techniques of persuasion and propaganda, including advertising, political campaigns, and marketing techniques. (3Sp)

3320. Conflict and Crisis Management. Theory and application of techniques for assessing, managing, and defusing crises and conflicts, both internal and external, in business settings. Prerequisite: Minimum grade of *C+* in Comm 1300 or permission of instructor. (3F)

3330. Selling Mass Media Space and Time. Theory and practice of planning, designing, and implementing media advertising sales campaigns and presentations. Business aspects of mass media advertising. (3Sp)

DSS 3400. Gender and Communication. Processes through which various forms of communication create gender roles and ideals for women and men, resulting in different gender-based communication patterns. Social implications and emphasis on gender in media professions. (3F,Sp)

DSS 3410. Film as Cultural Communication. Analysis of the economic, ideological, political, and cultural constraints influencing film content. How written texts are changed or distorted when translated into film. (3F,Sp)

4000. Senior Seminar in Mass Communication. Capstone seminar required of all majors. Includes small discussion groups to pull together and synthesize experiences of students in all concentrations. Examination of fundamental mass communication issues. Preparation for mass media careers. Prerequisite: Senior standing. (1F,Sp)

DSS 4010. Mass Communication Ethics. Study of ethical systems and philosophies and their applications to the practice of mass communication. (3F,Sp)

DSS 4020. Mass Media and Society. Study of theories and practice of the impact of mass media in conjunction with other social institutions: political, social, cultural, ideological, economic, and religious. (3F,Sp)

DSS 4030. Mass Media Law. Principles and theories of constitutional and case law governing the mass media, including libel and privacy, copyright, press freedom, broadcast regulation, and press responsibility. (3F,Sp)

4110. Computer-Assisted Reporting. Advanced computer-based investigative and in-depth information-gathering and newswriting, including intensive use of computer databases to collect and analyze data. Prerequisite: Minimum grade of *C+* in Comm 2120 or 2210 or 2310 or permission of instructor. (3F)

4120. Sports Writing. Information-gathering and writing of news and feature stories about sports for print and electronic mass media. Prerequisite: Minimum grade of *C+* in Comm 2120 or 2210 or 2310, or permission of instructor. (3F)

4150. Advanced Digital Photojournalism. Advanced lab work in the use of

cameras and photographic production techniques, photo imaging, and manipulation. Concludes with student exhibition of work. Prerequisite: Minimum grade of *C+* in Comm 2150 or permission of instructor. (3F,Sp)

4210. Newscast I. Basics of electronic newsgathering and writing for electronic news media. Use of electronic video equipment for creation of on-air newscast and other visual news materials. Prerequisite: Minimum grade of *C+* in Comm 2210. (3F,Sp)

4220. Newscast II. Newsroom organization and practice in electronic and video news production, including directing and producing, writing for video news, use of studio equipment, use of video production equipment, staff management, and control room operations. Prerequisite: Minimum grade of *C+* in Comm 4210. (3F,Sp)

4330. Advertising and Promotion. Examination of theory and practice of how media products employ advertising and promotion techniques to enhance market position, with an emphasis on management and marketing functions. (3F,Sp)

4500. Projects in Communication. Individualized directed study in communication topics, based upon student proposal to instructor. Prerequisite: Permission of instructor. Repeatable for up to 6 credits. (1-5F,Sp,Su) ®

4510. Communication Internship. Supervised, real-world training and practice in communication work places, including news and business environments. Prerequisite: Permission of instructor. Maximum of 6 credits may count toward the student's major. (1-3F,Sp,Su) ®

4520H. Senior Thesis. Planning and execution of an in-depth research paper or project, as approved by the instructor, culminating in a formal public presentation. Required of all communication students for graduation in Honors Program. Students must also complete Honr 4800. (1-3F,Sp)

4530. Special Topics in Communication. Advanced study in specialized communication topic areas. A maximum of 5 credits may be applied toward the major. (3F,Sp,Su) ®

5010 (d6010).[1] Mass Media Historiography. Survey of the history and development of the mass media, and their influence on other social institutions. Theory and practice of historical research, with heavy emphasis on use of databases, archival, and other primary sources to conduct original historical research. (3F,Sp)

5020 (d6020). Mass Communication Theory. Advanced study of major mass communication theories and issues, and their evidence in case studies. Application of theory to significant societal problems. (3F,Sp)

5030 (d6030). International Communications Problems. Study of mass communication influences and effects within and between nations. Systems and techniques of mass communication as functions of national identity and development. (3F,Sp)

5110 (d6110). Literary Journalism. In-depth analysis and practice of literary and stylistic elements of long-form journalistic and other nonfiction writers. (3F)

5210 (d6210). Multimedia. Principles and practice of producing interactive, computer-based multimedia products in various forms (CD-ROM, Internet), combining text, full-motion video, and sound for news and business clients. Prerequisite: Permission of instructor. (3Sp)

5220 (d6220). Advanced Video Production. Training and practice in advanced techniques of video production, including computer graphics generation, nonlinear video editing, and other specialized professional techniques for electronic video materials. Prerequisite: Minimum grade of *C+* in Comm 3210 or 4220 or permission of instructor. (3F,Sp)

5230 (d6230). Advanced Video Documentary Production. Advanced production of long-form video productions and packages, including writing scripts, directing and production, control room applications, and advanced video production techniques. Prerequisite: Minimum grade of *C+* in Comm 3210 or 4220 or permission of instructor. (3F,Sp) ®

5300 (d6300). Case Studies in Public Relations. Evaluation of and hands-on practice in real-world problems in public relations and corporate image-maintenance. Critical analysis of strategies for organizational positioning and use of mass media in furthering corporate objectives. Prerequisite: Minimum grade of *C+* in Comm 3300. (3F,Sp)

5310 (d6310). Mass Media Management. Examines theories, methods, and practice of management of mass media businesses, including personnel, marketing, and market positioning. Prerequisite: Permission of instructor. (3F,Sp)

5320 (d6320). Advanced Corporate Communications. Advanced analysis and study of the theory and practice of communication processes and techniques to connect both internal and external constituencies in business and organizational settings. Emphasizes communication theories and measurement of effectiveness of various strategies. Prerequisite: Minimum grade of *C+* in Comm 3300. (3F,Sp)

5400 (d6400). Mass Media Criticism. Critical analysis of mass media content, emphasizing the media's social, cultural, and political impacts. Use of advanced research techniques. Prerequisite: Permission of instructor. (3F,Sp)

5410 (d6410). Gender and the Mass Media. Examines the nature of gender-based images in a variety of mass media, from advertising to magazines, television, and film. Analysis of gender stereotypes and portrayals in news and entertainment media, along with resulting social impacts. Prerequisite: Permission of instructor. (3F,Sp)

5420 (d6420). The Mass Media and Politics. Examination of the role of the mass media in the political process, including both campaigns and governance. Examination of political advertising, news coverage, polling, opinion formation strategies, and politicians' use of new media technologies. (3F)

6000. Introduction to Graduate Study in Mass Communication. Overview of mass communication theories and research methodologies designed to prepare the student for the graduate course of study and to assist in planning research agenda. (3F)

6010 (d5010). Mass Media Historiography. Survey of the history and development of the mass media, and their influence on other social institutions. Theory and practice of historical research, with heavy emphasis on use of databases, archival, and other primary sources to conduct original historical research. (3F,Sp)

6020 (d5020). Mass Communication Theory. Advanced study of major mass communication theories and issues, and their evidence in case studies. Application of theory to significant societal problems. (3F,Sp)

6030 (d5030). International Communications Problems. Study of mass communication influences and effects within and between nations. Systems and techniques of mass communication as functions of national identity and development. (3F,Sp)

6040. Seminar in Mass Media Research Methods. Introduction to the major theoretical perspectives and methodologies in mass communication research. Repeatable for credit with departmental permission. (3F,Sp,Su) ®

6050. Seminar in Mass Media Issues and Problems. Variable topic seminar concerning research of issues and problems in mass media principles and practice. Repeatable for credit with departmental permission. (3F,Sp,Su) ®

6110 (d5110). Literary Journalism. In-depth analysis and practice of literary and stylistic elements of long-form journalistic and other nonfiction writers. (3F)

6210 (d5210). Multimedia. Principles and practice of producing interactive, computer-based multimedia products in various forms (CD-ROM, Internet), combining text, full-motion video, and sound for news and business clients. Prerequisite: Permission of instructor. (3Sp)

6220 (d5220). Advanced Video Production. Training and practice in advanced techniques of video production, including computer graphics generation, nonlinear video editing, and other specialized professional techniques for electronic video materials. Prerequisite: Minimum grade of *C+* in Comm 3210 or 4220 or permission of instructor. (3F,Sp)

6230 (d5230). Advanced Video Documentary Production. Advanced production of long-form video productions and packages, including writing scripts, directing and production, control room applications, and advanced video production techniques. Prerequisite: Minimum grade of *C+* in Comm 3210 or 4220 or permission of instructor. (3F,Sp) ®

6300 (d5300). Case Studies in Public Relations. Evaluation of and hands-on practice in real-world problems in public relations and corporate image-maintenance. Critical analysis of strategies for organizational positioning and use of mass media in furthering corporate objectives. Prerequisite: Minimum grade of *C+* in Comm 3300. (3F,Sp)

6310 (d5310). Mass Media Management. Examines theories, methods, and practice of management of mass media businesses, including personnel, marketing, and market positioning. Prerequisite: Permission of instructor. (3F,Sp)

6320 (d5320). Advanced Corporate Communications. Advanced analysis and study of the theory and practice of communication processes and techniques to connect both internal and external constituencies in business and organizational settings. Emphasizes communication theories and measurement of effectiveness of various strategies. Prerequisite: Minimum grade of *C+* in Comm 3300. (3F,Sp)

6400 (d5400). Mass Media Criticism. Critical analysis of mass media content, emphasizing the media's social, cultural, and political impacts. Use of advanced research techniques. Prerequisite: Permission of instructor. (3F,Sp)

6410 (d5410). Gender and the Mass Media. Examines the nature of gender-based images in a variety of mass media, from advertising to magazines, television, and film. Analysis of gender stereotypes and portrayals in news and entertainment media, along with resulting social impacts. Prerequisite: Permission of instructor. (3F,Sp)

6420 (d5420). The Mass Media and Politics. Examination of the role of the mass media in the political process, including both campaigns and governance. Examination of political advertising, news coverage, polling, opinion formation strategies, and politicians' use of new media technologies. (3F)

6500. Special Projects in Mass Communication Research and Practice. Directed study into specified research or real-world problems in the mass media and mass communication industries. Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (1-3F,Sp,Su) ®

6600. Thesis. Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (1-3F,Sp,Su) ®

6700. Graduate Advisement. Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of

Communicative Disorders and Deaf Education

College of Education

Head: Professor *Thomas S. Johnson,* speech-language pathology, voice disorders, anatomy of speech and hearing
Office in Communicative Disorders 102C, (435) 797-1381

Assistant Department Head: Clinical Instructor *Dee R. Child,* disorders of phonation, articulation, fluency

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Professors *James C. Blair,* educational audiology, education of the deaf and hard of hearing; *J. Freeman King,* American Sign Language, linguistics, teacher preparation; *Carol J. Strong,* language development, language assessment and intervention, language disorders in school-age students, research methodology in communicative disorders, narrative assessment and literature-based language intervention; *Steven H. Viehweg,* clinical audiology; **Adjunct Clinical Professors** *Steven D. Gray, MD,* pediatric otolaryngologist; *Bryan R. Larsen, MD,* gastroenterologist; *Gordon S. Wood, MD,* otolaryngologist; **Associate Professors** *Beth E. Foley,* neuropathologies of speech and language, augmentative/alternative communication, language and literacy; *Sonia S. Manuel-Dupont,* nondiscriminatory educational assessment of non-English-language background children, interpreter paraprofessional training and management, Native American language assessment, emergent literacy, ethnic literacy, developmental phonology, syntax, professional and scientific discourse analysis; **Assistant Professors** *Donald G. Barringer,* early interventions, sensory impairments, head-start research anad training; *Nancy E. Benham,* multi-disabled deaf, American Sign Language, deaf education; *Kim Corbin-Lewis,* diagnosis and management of voice disorders, laryngeal imaging, disorders of motor speech, dysphagia, anatomy and physiology of speech and swallow; *Jaclyn Littledike,* orofacial anomalies, professional practice issues, and clinical supervision; *Susan Watkins,* early intervention programs, sensory impaired infants and toddlers; **Instructors** *Kenneth M. Curtis,* electronystagmography, aural rehabilitation, hearing aids, noise and hearing conservation; *Ann S. Eldredge,* articulation, preschool screening, dementia; *Anne Elsweiler,* fluency, preschool language and articulation; *Janet K. Jensen,* public school programs, language disorders, and clinical supervisor; *Dorothy L. Johnson,* early intervention, sensory impairments; *Jan Kelley-King,* American Sign Language, deaf education; *Elizabeth Parker,* education of the deaf and hard of hearing; *Sheryl Y. Spriet,* pediatric audiology; *Susie Yoakum,* speech-language pathology, clinical supervision; **Adjunct Instructor** *Denise Ramirez,* sign language,

deaf education; **Adviser** *Mindy Bergeson*, deaf education

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Communicative Disorders and Deaf Education; Master of Science (MS), Master of Education (MEd), and Master of Arts (MA) in Communicative Disorders; MEd in Education of the Deaf and Hard of Hearing; Educational Specialist (EdS) in Communicative Disorders

Undergraduate emphases: *BS, BA*–Clinical and Educational Audiology, Education of the Deaf and Hard of Hearing, Speech-Language Pathology. The emphasis in Education of the Deaf and Hard of Hearing includes an area of focus in Elementary Education. **Graduate specializations:** *MS, MA, MEd*–Clinical and Educational Audiology, Early Childhood Communicative Disorders, Speech-Language Pathology; *MEd*–Education of the Deaf and Hard of Hearing; *EdS*–Educational Audiology

Undergraduate Programs

Objectives

Three main objectives of the Department of Communicative Disorders and Deaf Education are (1) to train competent speech-language pathologists, educators of the deaf and hard of hearing, and clinical-educational audiologists capable of receiving state and national certification; (2) to provide clinical services to individuals with speech-language deficits or hearing loss in the University population or in the community; and (3) to provide research opportunities for students relating to communicative problems of individuals. The programs in both Speech-Language Pathology and Clinical-Educational Audiology are fully accredited by the Educational Standards Board of the American Speech-Language-Hearing Association. The program in Education of the Deaf and Hard of Hearing is accredited by the Council on Education of the Deaf. All department programs hold Utah State Office of Education approval and NCATE accreditation.

Requirements

Departmental Admissions Requirements. Any accepted student at Utah State University may major in Communicative Disorders and Deaf Education (COMD-DE) during the freshman and/or sophomore years. However, during the first semester of the junior year, the student must formally apply for admission into the COMD-DE undergraduate professional preparation program and the College of Education Teacher Education Program. Application forms for admission into COMD-DE and the College of Education Teacher Education Program will be disseminated in class during the first semester of the junior year. As part of the application process for the College of Education Teacher Education Program, each student will complete the College of Education Writing Examination. The student will be accepted if cumulative grade point average is 3.0 or higher, University Studies credits are within 15 credits of completion, College of Education Writing Exam has been taken and passed, and all COM-DE courses taken to this point have grades higher than *C+*. Students who are accepted into the undergraduate program must maintain the acceptance standards each semester in order to continue in the major.

Transfer Students or students applying for admission into the program subsequent to the fall semester of their junior year must receive approval from the department head before beginning their matriculation in major classes.

Admission into the College of Education teacher education program is necessary before the student may take certification courses taught in the departments of Elementary Education, Special Education and Rehabilitation, and Secondary Education, which are supportive of the major. Admission into the teacher education program is also required prior to taking the Communicative Disorders clinical practicum coursework.

Bachelor's degree in Communicative Disorders and Deaf Education. There are two tracks available within the department: (1) **communicative disorders**, which includes emphases in *audiology* and *speech-language pathology*, and (2) **education of the deaf and hard of hearing**. Though the BS or BA is available in both tracks, the student should be aware that there is no professional employment certification in either communicative disorders or education of the deaf and hard of hearing at the bachelor's level. Majors in the **communicative disorders** track need to complete a core curriculum consisting of ComD 2400, 2910, 3100, 3120, 3400, 3500, 3650, 3700, 3910, 4100, 4400, 5070, 5100, 5200, and 5330. Majors in the **education of the deaf and hard of hearing** track need to complete a core curriculum consisting of an elementary, secondary, early childhood, or special education major, including professional breadth requirements, and deaf education requirements consisting of ComD 2500, 2620, 2910, 3010, 3910, 4910, 5630, 5640, 5650, 5660, 5670, and 5680. The undergraduate major for communicative disorders and deaf education consists of 41 semester credits of courses specified by the department, plus 4-8 semester credits of extra departmental coursework. Current national board and state educational agency certification requirements demand more coursework than the minimum numbers required for University graduation. Students desiring supportive courses for majors in special education, elementary or secondary education, family life, psychology, or other related departments are advised to seek counsel from the departmental adviser in determining an effective minor core.

Education of the Deaf and Hard of Hearing. Students wishing to obtain certification to teach the deaf and hard of hearing will need to complete the majority of the requirements for a teaching certificate in early childhood education, elementary education, secondary education, or special education. In conjunction with meeting the majority of requirements for certification, the student must complete coursework leading to a bachelor's degree in Communicative Disorders and Deaf Education, with an emphasis in Education of the Deaf and Hard of Hearing. The department has an undergraduate adviser for this program.

Course Requirements

Each student in the Communicative Disorders and Deaf Education Major must complete a component of professional training, which includes departmental and extra-departmental coursework. This professional training component includes the following courses: ComD 2400, 2500, 2910, 3100, 3120, 3400, 3500, 3650, 3700, 3910, 4100, 4400, 5070, 5100, 5200, 5330;

Engl 1010, 2010; Spch 2600; Biol 1010; Biol 2000 or 2010; CS 1010 or BIS 1400; Math 1010, 1050; Psy 1010, 1400, 2800; and SpEd 4000.

Additional Information

For more information concerning graduation requirements and course sequencing, see the major requirement sheet, available from the Department of Communicative Disorders and Deaf Education.

Because many of the undergraduate COMD-DE courses are taught in sequence, students should meet with a departmental adviser prior to beginning classes in the COMD-DE major to assure that the most efficient and effective schedule is followed. Students should also confer with a departmental adviser for information about changes in requirements or scheduling.

Graduate Programs

Admission Requirements

A bachelor's degree in Communicative Disorders or equivalent requirements must be completed before the student enters the graduate program. The time required to complete the master of science degree is determined during the first semester of study by a temporary department committee consisting of professors from the student's direct field of study.

Students seeking the MEd with a specialization in education of the deaf and hard of hearing must have either an undergraduate degree in early childhood, elementary, secondary, or special education, or an undergraduate degree from USU's program in education of the deaf and hard of hearing. Students coming into the master's degree with a degree other than deaf education will need to plan on a two-year MEd program, while those coming directly through the USU curriculum will need to plan on a one-year master's degree program.

Applications will be considered once a year between March 1 and March 15. However, students must have completed the application process to the School of Graduate Studies by February 15. No application will be considered until all the required information is submitted to the School of Graduate Studies.

Master's Degrees

Generally, all students will complete the requirements as specified below. In some instances students will have had some of the coursework required in the graduate curriculum as part of the undergraduate training at another institution. In those cases, the program will be individualized to meet national certification through the American Speech-Language-Hearing Association (ASHA) and state educational certification and licensure from the State of Utah. In no instance will students amass fewer than 36 graduate credits.

At the end of their programs, all graduate students, except for those in education of the deaf and hard of hearing, must take and pass the NTE examination in their area of specialty. This must be done before a letter of completion will be sent to the School of Graduate Studies. Students are required to list USU as a recipient of NTE test scores.

Speech-Language Pathology. The program in speech-language pathology is accredited by the Educational Standards Board of the American Speech-Language-Hearing Association (ASHA). The Utah State Office of Education has also approved the program. Students completing the master's curriculum are eligible for certification from ASHA and the State of Utah Board of Education and additionally have met the academic and practicum requirements for licensure from the State of Utah. As a consequence of preparation and certification or licensure, students are prepared for employment in any setting where the services of a qualified provider of speech and language services are provided. The following courses are required for all students seeking the MS degree in speech-language pathology: ComD 6020, 6030, 6040, 6050, 6100, 6120, 6130, 6200, 6210, 6220, 6230, 6300, 6370, 6810, and 6970.

Clinical and Educational Audiology. The program in clinical and educational audiology is accredited by the Educational Standards Board of the American Speech-Language-Hearing Association (ASHA) and is also approved by the Utah State Office of Education. Students completing the master's curriculum are eligible for certification from ASHA and the State of Utah Board of Education, and additionally have met the requirements for licensure from the State of Utah. As a consequence of preparation and certification or licensure, students are prepared for employment in any setting where the services of a qualified provider of audiological services are provided. The following courses are required of all students seeking the MS degree in clinical and educational audiology: ComD 6230, 6310, 6320, 6330, 6340, 6350, 6360, 6370, 6380, 6390, 6410, 6420, 6500, 6600, and 6970.

Education of the Deaf and Hard of Hearing. The program in Education of the Deaf and Hard of Hearing is accredited by the Council on Education of the Deaf (CED) and is also approved by the Utah State Office of Education. Students completing this program are certifiable by the Utah State Board of Education as teachers of the deaf and hard of hearing and they also meet the requirements for certification by CED. Students who complete the curriculum are prepared to provide services as teachers of the deaf and hard of hearing in any setting in which such services are furnished. The following courses or their equivalent are required for all students seeking the MEd in education of the deaf and hard of hearing: ComD 2500, 2620, 2910, 3010, 3910, 4910, 5100, 5610, 5630, 5640, 5650, 5660, 5670, 5680, 5910, 6640, 6650, 6700, 6710, 6800, 6820, 6830, and 6850.

Educational Specialist Degree

The department offers an Educational Specialist (EdS) program that can be individualized to suit a candidate's need within a basic structure of educational audiology and with foci on research, supervision, and evaluation. The program is designed for those individuals who have completed the master's degree and who are practicing in educational settings. The degree requires a minimum of 30 credits beyond the master's degree and may be completed in part through coursework in the summer and

extension study and research in conjunction with the individual's workplace.

Course Requirements

Graduate Courses in Speech-Language Pathology: *Year One—First Semester:* ComD 6020, 6030, 6040, 6050, 6100, 6130; *Second Semester:* ComD 6100, 6120, 6810; *Year Two—First Semester:* ComD 6200, 6210, 6220, 6230, 6370; *Second Semester:* ComD 6300.

Graduate Courses in Audiology: *Year One—First Semester:* ComD 6310, 6320, 6400, 6420; *Second Semester:* ComD 6230, 6340, 6370, 6390, 6400; *Third Semester:* ComD 6330, 6350, 6360, 6400, 6970; *Year Two—First Semester:* ComD 6380, 6400, 6410, 6970; *Second Semester:* ComD 6960, 6970.

Graduate Courses in Education of the Deaf and Hard of Hearing: Students entering the program in Education of the Deaf and Hard of Hearing may choose one of three tracks. **Track one** is followed by students who have obtained their bachelor's degree in Communicative Disorders and Deaf Education with a focus in Education of the Deaf and Hard of Hearing; **track two** is followed by those who come into the program without the required background in Education of the Deaf; and **track three** will follow the program outlined for those who wish to focus on Early Childhood Deaf Education only. *Track 1—Fall Semester:* ElEd 5150, 5250, ComD 5910, 6640, 6650, 6700, 6710; *Spring Semester:* ComD 6800, 6820, 6830, 6850; *Track 2—Fall Semester (Year 1):* ComD 2500, 2620, 3010, 5660, 5670; *Spring Semester (Year 1):* ComD 5610, 5630, 5640, 5650, 5680; *Fall Semester (Year 2):* ComD 5910, 6640, 6650, 6700, 6710; *Spring Semester (Year 2):* ComD 6800, 6820, 6830, 6850; *Track 3—Fall Semester:* ComD 4910, 5630, 5660, 5680.

Research Requirements

Several options are available for graduate students to complete the research or special project required for the MS or MEd. These options are specified in the list of requirements available in the department office, and include for the MS, the traditional Plan A experimental thesis option, the Plan B integrative review option or creative project option, the Plan C additional coursework option, and for the MEd, a creative project option. Declaration of an option must be made at the time the student files an Application for Candidacy form with the School of Graduate Studies. Changes in the option will necessitate a complete revision and review of the Application for Candidacy by the student's supervisory committee.

Certification. Each undergraduate and graduate is advised on which classes will meet Utah State Office of Education and American Speech-Language-Hearing Association certification requirements, as well as Utah State Professional Licensure requirements. State Office of Education certification credentials within Utah include approval for audiology, speech-language pathology, and education of the deaf and hard of hearing. Graduation from any of these programs ensures the student is certifiable in Utah. Such certification facilitates meeting other requirements for other states because of reciprocal agreements that exist among some state educational agencies throughout the country.

Practicum Opportunities

Practicum experience at the graduate level is available in a variety of settings. The department maintains a Speech-Language-Hearing Center offering a full range of diagnostic and remedial services to individuals with speech-language or hearing disabilities. Additionally, students are assigned to off-campus practicum sites such as hospitals, schools for the deaf, convalescent centers, clinics, physician's offices, and public schools. Placement in out-of-state practicum sites is available for those students who request it. Students may also be placed at the Center for Persons with Disabilities for experience in a multidisciplinary, severely handicapped setting. **Students must be enrolled in clinical practicum each semester of their graduate program.**

Financial Assistance

Limited departmental and federal grant support is available to graduate students and is awarded on a competitive basis. The application form for financial support must be submitted to the department no later than March 1 for consideration for the coming year.

Career Opportunities

Audiology graduates are prepared to work as clinical, educational, and rehabilitative audiologists. Speech-Language-Pathology graduates are prepared to work in a variety of medical and school settings. Graduates in the area of Education of the Deaf are trained to work in total communication, bilingual/bicultural, and auditory-aural settings.

Additional Information

Specific details about each of the foregoing degree programs are outlined in policy and procedure documents available through the department. All requirements are subject to change; check with the department for current requirements. Additional information may be obtained by contacting the Department of Communicative Disorders and Deaf Education.

Communicative Disorders and Deaf Education Courses (ComD)

2400. Orientation and Observation. Introduces students to the professional responsibilities required of communicative disorders and deaf education specialists in a variety of employment settings. Observation of normal/abnormal communication abilities. Language, hearing, and speech disorders. (1F,Sp) ®

2500. Language, Speech, and Hearing Development. Language, speech, and hearing development throughout life and strategies for facilitating development. Requisites for human communication and language learning. Theoretical models of language acquisition and intracultural/intercultural differences. Nature, causes, and prevention of language, speech, and hearing disorders. (3F,Sp)

2620. Teaching Reading to Deaf and Hard of Hearing Children. Exploration of resources and methods used to teach reading to deaf and hard of hearing children. Discussion of current research regarding the effectiveness of these methods and ideas for improving reading instruction. (3F)

CI 2910. Sign Language I. Introduction to American Sign Language and deaf culture. Focuses on receptive skills, with some instruction relative to rules, grammar, and culture associated with American Sign Language. Total immersion approach is used. (3F,Sp)

3010. Children with Multiple Disabilities and Hearing Loss. Students will obtain a basic understanding of the problems and characteristics of children who have hearing loss plus one or more disabling conditions. Teaching strategies will also be discussed. (3F)

3050. Practicum and Methods in Teaching Children who are Deaf and Hard of Hearing. Students investigate various aspects of teaching methods through field experiences in the classroom, curriculum and effective teaching assessment, observation and reflections, and guest speakers focusing on areas of mathematics and science in the primary grades. (1-3F,Sp) ®

3080. American Sign Language Practicum. Provides opportunities for practice and continued improvement of receptive and expressive skills in American Sign Language. (1F,Sp) ®

3100. Fundamentals of Anatomy for Speech and Language. Basic study of the structures and functions associated with the subprocesses of speech and hearing, including respiration, phonation, resonation, articulation, neurology, and hearing. Prerequisite: Biol 2000 or 2010. (3F)

3120. Disorders of Articulation and Phonology. Introduction to articulation and phonological disorders and related problems. Emphasis directed at evaluation, management, and measures of success. Principles of programming are presented. Prerequisites: ComD 2500 and 3500. (3Sp)

3400. Acoustics and Anatomy of the Ear. Principles of physical acoustics as applied to Communicative Disorders. Course includes anatomy, physiology, and metabolism of the human auditory system. (3F)

3500. Phonetics/Developmental Phonology. Study of the development of the phonological subsystem in English and the acoustic and physiological characteristics of speech sounds. (3F)

3650. Clinical Processes and Behavior. A consideration of clinical management as an interactive process. Interpersonal sensitivity, technical knowledge and skills, professional infection-control measures, and behavior modification are core considerations. Prerequisites: ComD 2500 and Psy 1010. (2Sp)

3700. Basic Audiology and Acoustic Immittance. Study of pure tone audiometry, including clinical masking, speech audiometry, and clinical immittance measures. Laboratory exercises are required. Prerequisite: ComD 3400. (3Sp)

3910. Sign Language II. Development of expressive and receptive skills in American Sign Language, focusing on idiom-like expressions, number systems, rules, grammar, and conversational language. Total immersion approach is used. Prerequisite: ComD 2910 or instuctor approval. (3F,Sp)

CI 4100. Clinical Practicum in Speech-Language Pathology. Supervised diagnostic and treatment practicum with individuals with communication disorders. Prerequisites: ComD 2500, 3120, 3650, and permission of instructor. (1-2F,Sp,Su) ®

4400. Clinical Practicum in Audiology. Supervised diagnostic and treatment practicum with individuals with hearing loss. Prerequisites: ComD 3400, 3650, 3700, and consent of instructor. (1-2F,Sp,Su) ®

4600. Senior Thesis. Student-initiated research project under faculty supervision. Prerequisites: Satisfactory grade point average, instructor recommendation, and approval of Honors Committee. (1-6F,Sp,Su) ®

CI 4910. Sign Language III. Development of expressive skills in American Sign Language (ASL) and code switching skills. Presentations by students are critiqued by instructor. Prerequisite: ComD 3910. (3F,Sp)

5000. Institute in Communicative Disorders and Deaf Education. Special colloquial offerings in communicative disorders and deaf education. (1-3F,Sp,Su) ®

5070. Speech Science. Explores contemporary theory, research findings, clinical applications, and laboratory experiences in measurement and analysis of normal speech production. Speech subsystems of respiration, phonation, articulation, and resonation are examined in detail through the collection and analysis of physiologic data. (2Sp)

5100. Language Science. Study of clinical analysis of syntactic and morphological properties of speech. (3Sp)

5200. Language Assessment and Intervention for Preschool Children. Preschool assessment and intervention, including language sampling and analysis procedures, test administration and interpretation, informal language assessment, intervention goals and objectives, planning clinical management, language facilitation strategies, teaching approaches, classroom-based language intervention, and enhancing emergent literacy. Prerequisite: ComD 2500 or equivalent. (4Sp)

5330. Aural Rehabilitation. Ramifications of hearing loss among children and adults and rehabilitative audiological techniques and programs. (3Sp)

5610. Introduction to Education of the Deaf and Hard of Hearing. Provides students with an overview of the history of educating children who are deaf and hard of hearing. Presents an overview of techniques, as well as the philosophical views that have led to the many teaching methods for the deaf and hard of hearing. (3F)

5620. Curriculum Adaptations for Teachers of the Deaf and Hard of Hearing. Methods for adapting or modifying curriculum prepared for children with normal hearing to more appropriately meet the needs of the deaf and hard of hearing. (1Sp)

5630. Audiology and Teachers of Children who are Deaf and Hard of Hearing. Focuses on the field of audiology and how information from this discipline relates to education of deaf and hard of hearing children. (3Sp)

5640. Teaching Speech to Deaf and Hard of Hearing Children. Evaluative and instructional models, processes, and methodologies in the development of speech for children who are deaf and hard of hearing. (3Sp)

5650. Teaching the English Language to Individuals who are Deaf and Hard of Hearing. Evaluation and teaching of the English language to individuals who are deaf and hard of hearing. Language development and remediation using structure, modeling, natural approach, and grammar. Prerequisite: ComD 2500. (3Sp)

5660. Early Intervention for Children Who are Deaf and Hard of Hearing. Family-centered early intervention for infants and young children who are deaf and hard of hearing. Identification, testing, hearing aids, communication, auditory, language, and emerging literacy programming, parent and family programs, mentoring. (3F)

5670. Psychological Principles and Individuals who are Deaf and Hard of Hearing. Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. (3Sp)

5680. Socio-Cultural Aspects of Deafness. Leads students to understand how society, political institutions, and education have impacted the deaf culture. (3Sp)

5860 (d6860).[1] Interdisciplinary Training in Assistive Technology I. Provides interdisciplinary training in assistive technology, focusing on assistive devices related to powered mobility, seating and positioning, computer access, and augmentative and alternative communication. Prerequisite: Deparartmental permission. (3F)

5870 (d6870). Interdisciplinary Training in Assistive Technology II. Provides advanced training in assistive technology, focusing on assistive devices related to cognitive, hearing, visual, and dual sensory impairments. Funding issues also addressed. (3Sp)

5900. Independent Study. Selected work individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. (1-6F,Sp,Su) ®

5910. Sign Language IV. Basic concepts of linguistics pertaining to ASL structure. Students must have a good understanding of ASL structure and excellent receptive ASL skills. Prerequisites: ComD 2500, 3120, 4100, and 5200. (3F)

6020. Language/Communication Management in the Schools. Explores language and communicative disorders services in schools, including administration, organization, management, scheduling, inservice, multidisciplinary teams, IEP development, and federal and state laws. Emphasizes assessment and intervention for school-age language disorders. Prerequisites: ComD 2500, 3120, 4100. (3F)

6030. Disorders of Fluency—Stuttering. Provides understanding of theory, nature, etiologies, and principles of diagnosis and treatment of communication disorders related to stuttering and other disorders of fluency. (2F)

6040. Communication Disorders Related to Orofacial Anomalies. Nature,

etiologies, and principles of diagnosis and treatment of communication disorders related to orofacial anomalies. Prerequisite: Graduate standing. (2Sp)

6050. Professional Practice in Speech-Language Pathology. Lecture, discussion, and guest presenters on various professional practice topics pertaining to speech-language pathology. Prerequisite: Graduate standing. (1F)

6100. Advanced Clinical Practicum in Speech-Language Pathology. Supervised diagnostic and treatment practicum with individuals with communication disorders. Prerequisites: ComD 2500, 3120, 3650, or equivalent, and permission of instructor. (1-3F,Sp,Su)

6120. Motor Speech Disorders and Dysphagia. Considers the neurological substrates and clinical manifestation of dysarthria, apraxia, and dysphagia in the adult population. Addresses diagnostic methods and management of these disorders. (3Sp)

6130. Neuroanatomy/Physiology and Neuropathologies in Speech and Language. Neuroanatomical and neurophysiological bases underlying neurologically-based communicative disorders. Study of neurologically-based speech and language disorders, including aphasia, traumatic brain injury, dementia, right hemisphere dysfuction, and degenerative neurological diseases. (4F)

6200. Internship in Public Schools—Speech-Language Pathology. Supervised public school practicum in speech-language pathology. (1-4F,Sp,Su) ®

6210. Bilingual/Bicultural Services. Study of the cultural, linguistic, educational, and socioeconomic status of individuals with speech-language disabilities from ethnic or linguistic minority groups. (2F)

6220. Augmentative Communication. Study of the management of severe communication disorders, with a focus on assistive technologies applications. (2F)

6230. Introduction to Research in Communicative Disorders. Introduction to experimental research designs, including educational research and development, causal-comparative, correlational, and qualitative research. Includes research reviews, research proposals, threats to internal and external validity, and statistical/practical significance. Prerequisite: Psy 2800. (3Sp)

6300. Externship in Speech-Language Pathology. Supervised off-campus practicum externship in speech-language pathology. Prerequisite: Consent of instructor. (1-9F,Sp,Su) ®

6310. Advanced Hearing Science. Psychoacoustic concepts and principles, anatomy of the sensorineural and central auditory and vestibular systems, and advanced principles of acoustics as they apply to the profession of audiology. Prerequisites: ComD 3100, 3400, and 3700. (3F)

6320. Hearing Aids. Hearing aid types and uses, hearing aid components and characteristics, electroacoustic performance, hearing aid candidacy and hearing aid evaluation, and hearing aid fitting and orientation. Prerequisites: ComD 3400 and 3700. (3Sp)

6330. Electrophysiological Auditory Tests. Tests for vestibular disorder, evoked potentials testing (particularly ABR), and otoacoustic emissions. Prerequisites: ComD 3400, 3700, 6420. (3Sp)

6340. Advanced Hearing Aids. Applications of advanced hearing aid circuitry, especially digital and digitally programmable hearing aids. Presentation of various aspects of measuring hearing aid satisfaction. Tinnitus management and cochlear implants area also treated. Hearing aid trouble shooting, modifications, and repairs are included. Prerequisite: ComD 6310. (3Sp)

6350. Advanced Audiological Diagnosis. Special auditory testing for site of lesion in the conductive, sensori, neural, and central auditory systems. Tests for assessment of functional hearing loss are also included. Sensitivity and specificity of auditory tests are treated. Test results related to auditory disease process. Prerequisite: ComD 6420. (3Su)

6360. Private Practice in Audiology. Audiology business and practice management. Discussion of business set-up, the business plan, managerial accounting and financial analysis, marketing, pricing, reimbursement, record keeping, and forensics. (3Su)

6370. Educational Audiology. Management of deaf and hard of hearing children in the regular schools. Population and individual profiles, evaluation and staffing, models of delivery, integration considerations, remedial and facilitative programming. (3F)

6380. Educational Audiological Management. Assessment of children with hearing loss who are in the public schools. Management plans for audiological services, as well as appropriate intervention strategies for children. Students develop plans and present methods for bringing change to schools. Prerequisite: ComD 6370. (3Sp)

6390. Diseases of the Ear. Study of the etiology, symptomatology, audiological manifestations, and medical treatment of various pathological conditions of the auditory system. Prerequisites: ComD 3400 and 3700. (3F)

6400. Advanced Clinical Practicum in Audiology. Supervised advanced diagnostic and treatment practicum with individuals with hearing loss. Prerequisites: ComD 3400, 3700, or equivalent; and consent of instructor. (1-3F,Sp,Su) ®

6410. Industrial Audiology. Principles of noise hazard evaluation, effects of noise on the auditory mechanism, and development and maintenance of an effective hearing conservation program. Prerequisite: ComD 3400. (3F)

6420. Pediatric Audiology. Provides students with understanding of normal auditory development and theoretical, clinical, and practical issues involved in screening, assessment, and management of children with hearing loss. Prerequisites: ComD 3400, 3700, or equivalent. (3F)

6430. Speech Communication and Hearing Loss. History of listening and speech programs for the hearing impaired. Hearing aids and FM systems, as well as computer and electronic devices used in supporting the speech of this population. Discussion of cochlear implants, the palatometer, and TranSonic hearing aids. (3F)

6500. Internship in Public Schools—Audiology. Supervised public school practicum in audiology. Prerequisite: Consent of instructor. (1-6F,Sp,Su) ®

6600. Externship in Audiology. Supervised off-campus practicum externship in audiology. (1-9Sp,Su) ®

6640. Strategies for Teaching Speech and Listening to Children who are Deaf and Hard of Hearing. Practical methods for applying theories of speech and listening in classrooms where deaf and hard of hearing children are educated. Prerequisite: ComD 5640. (3F)

6650. Straegies for Teaching English Language to Children who are Deaf and Hard of Hearing. Practical methods for applying theories of teaching the English language in classrooms where deaf and hard of hearing children are educated. Prerequisite: ComD 5650. (3F)

6660. INSITE Training. Training in implementation of the INSITE Model. Early home intervention for infants and young children having a combination of sensory impairments and other disabilities. (1-3F,Sp,Su)

6670. AHEAD Training. Training in implementation of the AHEAD Model. Early intervention services for families and child care providers of children with noncategorical disabilities, birth to three years, in home and child care settings. (1-3F,Sp,Su)

6680. SKI*HI Training. Training in implementation of the SKI*HI Model. Early home intervention for infants and young children who are deaf and hard of hearing, and their families. (1-3F,Sp,Su)

6690. Early Intervention for Infants and Toddlers with Vision Impairment and Their Families. Students will gain an understanding of and develop skills in working with infants and toddlers who are visually impaired and their families. (1-3F,Sp,Su)

6700. Practicum in Education of Children who are Deaf and Hard of Hearing. Supervised diagnostic and remedial casework in education of the deaf and hard of hearing. (1-3F,Sp,Su) ®

6710. Mainstreaming Children who are Deaf and Hard of Hearing. Rationale and procedures used to successfully mainstream children with hearing loss. Also methods of evaluating programs where children with hearing loss are to be placed. (3F)

6720. Serving Preschoolers with Vision Impairments in Center Based Settings. To provide students with knowledge and skills in working with children with visual impairments in the preschool setting. (1-3F,Sp,Su)

6800. Student Teaching in Education of Children who are Deaf and Hard of Hearing. Supervised diagnostic and remedial casework in education of the deaf and hard of hearing. (2-6Sp)

6810. Disorders of Phonation. Advanced consideration of issues and methods in the diagnosis and treatment of voice problems associated with the larynx and the respiratory tract. (3Sp)

6820. Principles of Intervention for Children who are Deaf and Hard of Hearing. Application of teaching principles to classrooms for the deaf and hard of hearing. Practicum with children is part of this course. Prerequisites: ComD 6640, 6650, and permission of instructor. (3Sp)

6830. Residential Education of Children who are Deaf and Hard of Hearing. Issues related to residential placement of children who are deaf and hard of hearing. Practicum with children is part of this course. Prerequisites: ComD 6640, 6650, and permission of instructor. (3Sp)

6850. Seminar in Communicative Disorders and Deaf Education. Research and analysis of selected topics. (1-3F,Sp,Su) ®

6860 (d5860). Interdisciplinary Training in Assistive Technology I. Provides interdisciplinary training in assistive technology, focusing on assistive devices related to powered mobility, seating and positioning, computer access, and augmentative and alternative communication. Prerequisite: Deparartmental permission. (3F)

6870 (d5870). Interdisciplinary Training in Assistive Technology II. Provides advanced training in assistive technology, focusing on assistive devices related to cognitive, hearing, visual, and dual sensory impairments. Funding issues also addressed. (3Sp)

6900. Independent Study. Prerequisite: Permission of instructor. (1-9F,Sp,Su) ®

6960. Master's Project. This experience provides student with opportunity to design and carry out a creative project which is closely related to his or her area of teaching specialty. May require a written report. (1-4F,Sp,Su) ®

6970. Thesis. Prerequisite: Permission of instructor. (1-7F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-9F,Sp,Su) ®

7330. Supervision Internship. Provides extensive supervisory experience for advanced students. Internship is for a period of time to be specified by the department and cooperating agency. Prerequisite: Permission of instructor. (1-7F,Sp,Su) ®

7510. Supervision in Communicative Disorders. Principles and practices of supervision in Communicative Disorders and Deaf Education. Emphasizes clinical and educational supervision as these styles relate to individuals who are deaf and hard of hearing or who have communicative disorders. (2Su)

7810. Research Seminar in Educational Audiology. Identification of research problem, consideration of research strategies and methods, application of research and statistical concepts in departmental focus, interaction with faculty. (1-3F,Sp,Su) ®

7900. Independent Study. Advanced students, under direction of a faculty member, will study independently; however, departmental permission is necessary. (1-2F,Sp,Su) ®

7910. Independent Research. Advanced students, under direction of a faculty member, will do research in an area of interest to themselves. (1-2F,Sp,Su) ®

7970. Dissertation. Variable credit for dissertation project in connection with the doctoral program emphasis in educational audiology. (1-9F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-9F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

Department of
Computer Science

College of Science

Head: Associate Professor *Donald H. Cooley*, fuzzy logic, genetic algorithms, neural networks, multimedia systems
Office in Main 414, (435) 797-2451

Associate Head and Coordinator for Graduate Programs in Computer Science: Associate Professor *Gregory W. Jones*, computability, GUIs, software engineering
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Professor *Scott R. Cannon*, parallel processing, real-time systems, biomedical applications; **Professors Emeritus** *Rex L. Hurst*, statistical computation, information systems; *Wendell L. Pope*, data structures, automatic software generation, programming languages; **Associate**

Professors *Stephen J. Allan*, parallel processing, parallel programming, recognition of parallelism, program optimization; *Vicki H. Allan*, instruction-level parallelism, register allocation, software pipelining, program optimization; *Heng-Da Cheng*, image processing, artificial intelligence, parallel processing, computer vision, fuzzy logic, VLSI algorithms and architectures, neural networks; *Nelson T. Dinerstein*, analysis and construction of information systems, database management systems, applications of small computers; *Larre N. Egbert*, scientific computing, computer graphics; *Nicholas S. Flann*, machine learning, artificial intelligence; *Jianping Zhang*, artificial intelligence, machine learning, intelligent computer-aided instruction; **Assistant Professors** *Stephen W. Clyde*, software engineering, object orientation, distributed systems, database theory, multimedia systems; *Daniel W. Watson*, parallel and heterogeneous computing, interconnection networks; **Lecturers** *Kendra S. Dinerstein*, introductory programming; *Mary Veronica Kolesar*, introductory computing

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Computer Science

Undergraduate emphases: *BS, BA*–Science, Digital Systems, Information Systems; **Graduate specializations:** *MS*–Artificial Intelligence, Parallel Systems, Software Engineering

Undergraduate Programs

Objectives

The course of study offered by the Department of Computer Science is directed primarily toward developing the problem solving skills of its students. This, in conjunction with the understanding of computers and computer systems provided by coursework, will enable a graduate of the program to apply his or her knowledge to finding solutions to problems that arise in the sciences, business, industry, government, and education sectors.

Students who have the ability to think analytically and creatively will find a challenging and exciting future in computer science.

Opportunities for practical applications of computer science skills are available with members of the computer science faculty who are engaged in research and consultation work both on and off campus.

Computer Science

Computer Science deals with information structures and processes as they are represented and implemented in modern high-speed digital computers, and with information processing systems designed to implement useful applications of computing.

The program in computer science attempts to provide a solid foundation of knowledge about computers and to teach a mode of thinking which will permit continuing growth on the part of graduates. Prospective students should have an aptitude for mathematics and logic and an interest in analysis and deduction.

Computer science is one of the fastest growing fields of study in our society. Excellent employment opportunities are available to computer science graduates. All of the major corporations hire computer science graduates. Graduates in Computer Science work for such Utah-based corporations as Novell, Corel, Evans and Sutherland, TRW, and Thiokol.

The Computer Science bachelor's degree is a four-year degree with areas of emphasis or options in Science, Digital Systems, and Information Systems. In addition, by working with a departmental adviser, students may develop a plan of study tailored to their own unique career objectives.

Science Option

The Science Option is designed for those who plan to pursue scientific or technical careers, research, or graduate education in computer science. Students choosing the science option will take courses in programming languages, the theory of computation, and math courses in calculus, linear analysis, and multi-variable calculus. Additional courses include a variety of upper-division computer science courses, chosen in consultation with an adviser.

Digital Systems Option

The Digital Systems Option is available for those interested in both the hardware and software aspects of computer systems. In addition to computer science and mathematics courses, students in this option will take electrical engineering courses in electronics, circuits, digital fundamentals, microcomputer systems, and digital system design. The curriculum for students in this option is similar to that for students in the computer engineering option of Electrical and Computer Engineering.

Information Systems Option

The Information Systems program at Utah State University offers a common core of courses through two department majors: (1) Business Information Systems and Education and (2) Computer Science. The curricula of the individual departments differ substantially in emphasis.

The Computer Science major with an Information Systems option is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this option are trained in all phases of the analysis, design, and implementation of Information Systems. As part of this option, students also receive training in the theory and application of information with courses in Telecommunications and Expert Systems. Students select an application area such as Business, Accounting, or Economics. Other application areas can be developed by working closely with an adviser. This program of study, offered within the College of Science, leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science.

The Business Information Systems major, Information Systems Management emphasis, is offered in the Business Information Systems and Education Department, College of Business (see page 133). The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, and information systems managers in business and industry. BIS majors take required courses in analysis and design, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects to include a

Business Administration minor. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a Master of Science in Business Information Systems and Education with an area of emphasis in Information Systems Management. See page 135 for additional details.

Department and General College of Science Requirements

In addition to the University Studies requirements, all majors in computer science must complete a total of 30 semester credits in writing, languages, humanities, arts, and/or social sciences. Courses taken to meet the University Studies requirements, if applicable, may also be counted to meet this departmental requirement. Students must work closely with their adviser to meet both these requirements.

Bachelor of Science Core Requirements. Students working toward the Bachelor of Science degree in Computer Science must complete the following:

1. One year of calculus, including Math 1210 and 1220. In some degrees or options within degrees, the second semester of calculus may be replaced by Stat 3000. The substitution will be for specific degree programs and not by student choice.
2. One of the following three year-long science sequences: (1) Biol 1210, 1220, 1230, 1240; (2) Chem 1210, 1220, 1230, 1240; or (3) Phyx 2110, 2120. The sequence chosen must be outside the student's department.
3. USU 1310 (Integrated Science). This course may also be applied toward the University Studies Breadth Life Sciences (BLS) or Breadth Physical Sciences (BPS) requirement.

The science credits must total at least 12 credits. For students taking Phyx 2110, 2120, and USU 1310, the total will be 11 credits. In this case, students must take one more adviser approved science classes.

Requirements

Summary of Departmental Admission and Retention Requirements

Admission requirements of the Department of Computer Science for freshmen are the same as those described for the University on pages 43-46. Transfer students with a 2.5 GPA may apply for admission to the department.

Before a student can register for a CS course, he or she must earn a grade of *C-* or better in all prerequisite courses. All required classes for the major must be completed with a grade of *C-* or better. Required courses, regardless of department, may not be taken pass-fail, and a Computer Science major must have advanced standing to register for a course at the 3000-level or above.

For a more complete statement of requirements, please contact the department directly. Requirements may change from time to time.

Bachelor of Science Degree

The department offers a degree program with emphases in science, digital systems, or information systems. The objectives are to train computer scientists who can relate to science, computer design, or business disciplines. Other areas of emphasis will be considered on an individual basis.

COMPUTER SCIENCE REQUIRED COURSES

Science Option

CS 1700, 1710, 1720, 2200, 2370, 2550, 2560, 3100, 4700; CS 5000 or 5050; Stat 2000; Math 1210, 1220, 2210, 2250, 3310; Math 4630 or 5610; Phil 2400 or 3520 or 3540; Spch 1050; at least 16 credits of upper-division adviser-approved computer science and/or computer engineering classes, at least 9 of which must be computer science classes.

Digital Systems Option

CS 1700, 1710, 1720, 2200, 2370, 2550, 2560, 3100, 4700; CS 5000 or 5050; Stat 2000; Math 1210, 1220, 2250, 3310; ECE 1020, 2410, 2530, 3530, 3610, 3710, 3720; Phil 2400 or 3520 or 3540; Spch 1050; at least 9 credits of upper-division adviser-approved computer science classes.

Information Systems Option

CS 1700, 1710, 1720, 2200, 2370, 2550, 2560, 3100, 4700; CS 5000 or 5050; Stat 2000; Math 1210, 1220, 2250, 3310; Acct 2010, 2020; Econ 1500; MHR 3110; Phil 2400 or 3520 or 3540; Spch 1050; at least 16 credits of upper-division adviser-approved computer science and/or computer engineering classes, at least 9 of which must be computer science classes.

Minor

Requirements for a minor in computer science are listed below. Also, minors may be tailored to meet a student's needs by consultation with a departmental adviser, before commencement of the minor.

Before beginning any minor, a student must meet with a departmental adviser and file an approved minor application form with the Computer Science Department.

Computer Science Minor

CS 1700, 1710, 1720, 2200; two additional CS classes selected from the following list: CS 2370, 2550, 2560, 3100, 4700, or any CS class numbered 5000 or above.

Graduate Programs

Computer science deals with the programming, use, management, and organization of computers. Graduate students specialize in many different areas, several of which have strong ties to other disciplines such as mathematics, electrical engineering, statistics, accounting, and business administration.

Admission Requirements

Applicants for the Master of Science degree in Computer Science should have a bachelor's degree in Computer Science **or** extensive experience with computing. Those whose quantitative score on the GRE general test is less than 640 must show

compensating strengths in their backgrounds to be considered. Applicants are encouraged to take the GRE subject exam in Computer Science. Those who do will have preference in the award of financial aid. Applicants should have programming skills in one or more high-level languages and mastery of the standard curriculum in computer architecture, data structures, automata, programming languages, and operating systems, as well as a working grasp of calculus and statistics. Decisions on financial assistance are made on or near March 15.

Course Requirements

Students must complete four Computer Science courses numbered between 6000 and 6950. CS 6250 and 6900 are *not accepted* for these four courses. CS 6950 can count as *only one* of these four courses, and in that case must be taken for at least 3 credits. Students must take 1 credit of CS 6900. No more than 3 credits of CS 6250, 1 credit of CS 6900, and 4 credits of CS 6950 can be used to satisfy the requirements of the MS degree.

Graduate-level courses taken outside the department should be approved by the candidate's committee prior to registration.

Graduate students without or with low GRE subject exam scores are required to pass three of the five departmental placement exams (Computer Architecture, Algorithms, Operating Systems, Compilers/Programming Languages, Computability Theory) upon entrance. As an alternative, students may choose to pass any of the following corresponding courses at USU, within one year, with a grade of *B*- or better: CS 2550 and 2560 or ECE 5750 (architecture); CS 2200 or 5050 (algorithms); CS 3100 (operating systems); CS 5300 (compilers) or CS 4700 (programming languages); and CS 5000 (computability theory).

Requirements change from time to time, so students are advised to check with the department or their adviser to determine whether the requirements at the time of graduation or in the first semester of registration as a graduate student will have effect.

Financial Assistance

Applicants for admission will automatically be considered for financial aid, with no need for additional application procedures. Continuing students will be requested to apply for aid during the spring semester. Acceptance into the program does not guarantee financial assistance.

Computer Science Courses (CS)

BPS 1010. Foundations of Computer Science, and the Application of Computer Science to the Investigation of Physical Systems and Phenomena. Investigation of basic scientific and mathematical principles as they apply to computing, computing systems, and computer science. Application of these principles to investigate physical systems and phenomena in physics, chemistry, geology, and mathematics. No prerequisites. (3F,Sp,Su)

1050. Problem Solving with Computers. Investigates problem-solving using methodologies of computer science. Emphasizes techniques used by computer scientists to solve problems, as well as the scientific method. Develops problem-solving methodology for both new and traditional computer applications. (3F,Sp)

1700. Introduction to Computer Science—CS 1. Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Computer science majors must enroll in CS 1710 concurrently with CS 1700. Prerequisite: Math 0900 or math ACT score of at least 23. (3F,Sp,Su)

1710. Introduction to Computer Science—CS 1 Lab. One-hour lab taught in conjunction with CS 1700. Students learn to develop correct software in a hands-on structured environment. Computer science majors are required to pass both the laboratory and the lecture, and are required to enroll in CS 1700 concurrently with CS 1710. For students not majoring in computer science, this laboratory is advised, but not required, for CS 1700. Prerequisite: Math 0900 or math ACT score of at least 23. (1F,Sp,Su)

QI 1720. Introduction to Computer Science—CS 2. Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Prerequisite: CS 1700. (3F,Sp,Su)

QI 2200. Algorithms and Data Structures—CS 3. Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Prerequisite: CS 1720. (3F,Sp,Su)

2250. Cooperative Work Experience. Provides credit for students working at a participating firm under faculty supervision. Prerequisite: Permission of instructor. (1-9F,Sp,Su) ®

CI 2370. Software Engineering. Science of small and large software project development, taught in team and project management format. Students complete a well-documented functional product, working in teams of four to five students. Prerequisite: CS 2200. (3F,Sp)

2550. Computer Organization. Fundamental building blocks of digital computers, and the underlying theories upon which these building blocks are assembled. Introduction to information representation, number systems, combinational logic circuits, sequential logic circuits, and instruction sets. Programming such systems at the assembly level. Prerequisite: CS 1710 and Math 1050. (3F,Sp)

2560. Computer Architecture. Architecture of a computer system, as viewed by the programmer. Topics such as memory management, RISC vs. CISC, pipelining, parallelism, interrupts, and networking discussed in detail. Includes several homework assignments, at least one of which deals with interrupts and interrupt-driven applications. Prerequisite: CS 2550. (3F,Sp)

DSC, CI, QI 3010. Information Acquisition, Analysis, and Presentation. Introduces students to use of scientific method and computer technology in analysis of multi-faceted problem, and presentation of that analysis. Each semester, built around single topic such as global warming. Prerequisites: Completion of Computer Literacy and Quantitative Literacy requirements. (3F,Sp,Su)

3100. Operating Systems and Concurrency. Design and implementation of operating systems. UNIX will be used as one example, but all categories of operating systems will be discussed. Presentation of the concept of concurrency as it applies to operating system design and application. Prerequisite: CS 2200. (3F,Sp)

DSC, CI 3410. Algorithm Development: JAVA/Internet. Introduces students to algorithm development and programming for JAVA-based applications, especially those dealing with the Internet. Examines computer-based representation, storage, retrieval, and transmission of information, along with the algorithms used to perform such operations. Prerequisites: Completion of Computer Literacy and Quantitative Literacy requirements. (3F,Sp,Su)

QI, DSC 3500. Algorithm Development: Visual BASIC/Graphical User. Introduces students to algorithm development and programming in Visual BASIC, with special emphasis on graphical user interfaces for Windows applications and environments. Prerequisites: Completion of Computer Literacy and Quantitative Literacy requirements. (3F,Sp,Su)

QI, DSC 3510. Algorithm Development: COBOL/Business. Introduces students to algorithm development and programming in COBOL. Special emphasis given to applications and algorithms for use in business and information processing applications. Prerequisites: Completion of Computer Literacy and Quantitative Literacy requirements. (3F)

4250. Cooperative Work Experience. Provides credit for students working at a participating firm under faculty supervision. Prerequisite: Permission of instructor. (1-9F,Sp,Su) ®

4700. Programming Languages. Theories of programming design and implementation. Introduction to variety of programming languages, showing how they represent trade-offs with respect to these theories. Prerequisite: CS 2200. (3F,Sp)

4710. Networking and Configuring Computer Systems. Explores fundamentals of computer networks. Discussion of LANs and WANs in Novell, NT, and Unix based environments. Instruction in adding peripherals and interface boards, and upgrading or installing software on computers. Prerequisite: CS 1720. (3Sp)

4950. Undergraduate Research. Participation in research projects, under supervision of a computer science faculty member. Prerequisites: CS 2200 and permission of instructor. (1-4F,Sp,Su) ®

5000. Theory of Computability. Theory of computation, including presentation of computability, decidability, and complexity. Includes formal grammars, finite and pushdown automata, and turing machines. Prerequisites: CS 2200, Math 3310. (3F)

5050. Advanced Algorithms. Study of algorithms and their analysis, including: design by induction, algorithms involving sequences and sets, graph algorithms, geometric algorithms, algebraic algorithms, reductions, NP-completeness, and parallel algorithms. Prerequisites: CS 2200, Math 3310. (3Sp)

5100. Graphical User Interfaces and Windows Programming. Design principles of GUIs and philosophy, structure, and programming in Windows environments. Prerequisite: CS 2200. (4Sp)

5200. Distributed Systems Design. Study of design concepts for distibuted software systems, including client/server architectures, transparency, file services, directory services, migration, replication, collaboration, and security. Prerequisite: CS 3100. (4Sp)

5300. Compiler Construction. Review of programming language structures, translation, loading, execution, and storage allocation. Compilation of declarations, expressions, statements, and procedures/functions. Organization and design of a compiler. Prerequisite: CS 4700. (4F)

5370. Advanced Software Engineering. Advanced software engineering concepts, including project management, requirements acquisition, formal methods of specification and verification, object-oriented design, and software testing. Student cannot receive credit for both CS 5370 and CS 6370. Prerequisite: CS 2370. (3F)

5400. Computer Graphics I. Introduction to concepts of graphical techniques. Digital and pictorial representation of information. Prerequisites: CS 2200; Math 1220; Math 2250 or 2270. (4F)

5450. Multimedia Systems. Introduction to concepts and techniques underlying multimedia-based systems. Deals with both the hardware aspects of multimedia systems (e.g., transfer rates, capacities, resolution, etc.) and the software requirements of such systems. Each student required to develop a multimedia-based system. Prerequisite: CS 2200. (3Sp)

5500. Parallel Algorithms. Examines basic techniques for designing parallel algorithms, such as balanced trees, pointer jumping, partitioning, pipelining, accelerated cascading, list ranking, and tree contraction. Consideration of classic parallel algorithms in graphs, merging, sorting, planar geometry, string matching, and randomized techniques. Prerequisite: CS 2200. (3F)

5550. Parallel and Network Programing. Introduction to parallel and network programming. Topics include granularity and scalability, comparison of parallel architectures, communication models, and programming models. Students learn to write Unix-based network programs and MPI-based parallel programs. Prerequisite: CS 3100. (3Sp)

5600. AI: Problem Solving and Expert Systems. Introduction to practical artificial intelligence methods for building problem solving and expert sytems. Covers search, knowledge representation, and reasoning. Students will develop projects in LISP and expert system shells. Prerequisite: CS 2200. (3F)

5650. AI: Pattern Analysis and Machine Intelligence. Introduction to theories and techniques of machine intelligence, with emphasis on pattern recognition, computer vision, fuzzy logic, and neural networks. Prerequisites: CS 2200, Math 2270, Stat 2000. (3Sp)

5700. Object-Oriented Software Development. Study of fundamental object-oriented principles, including abstraction, encapsulation, classification, and inheritance. Application of these principles in systems analysis, specification, design, implementation, and testing. Prerequisite: CS 2370. (3Sp)

5800. Introduction to Database Systems. Comparison of various database systems. Normal forms, protection, concurrency, security and integrity, and distributed and object-oriented systems. Prerequisite: CS 2200. (3F)

5850. Systems Analysis. Theory and practice of analysis, design, and implementation of information systems. Students will construct an information system. Prerequisite: CS 5800. (3Sp)

5900. Topics in Computer Science (Topic). Current topics in computer science as determined by advances in the field. Prerequisite: CS 2200 and permission of instructor. (3Su) ®

5950. Independent Study. Provides for independent study of selected topics. Prerequisites: CS 2200 and permission of instructor. (1-6F,Sp,Su) ®

6250. Cooperative Work Experience, Graduate. Provides credit for students working at a participating firm under faculty supervision. Prerequisite: Permission of instructor. (1-9F,Sp,Su) ®

6300. Supercompilers for Sequential and Parallel Computers. Analysis and optimization for sequential and parallel computers, including loop restructuring, concurrency analysis, vector analysis, and optimizations for shared and distributed memory computers. Prerequisite: CS 5300. (3Sp)

6370. Software Engineering with a Project. Advanced software engineering concepts, including project management, requirements acquisition, formal methods of specification and verification, object-oriented design, and software testing. Students will work in teams, developing significant software products. Student cannot receive credit for both CS 5370 and CS 6370. Prerequisite: CS 2370. (3F)

6400. Computer Graphics II. Study of computer rendering of three-dimensional objects. Object representation, hidden surface removal, and shading. Ray tracing of synthetic scenes using mathematically defined surfaces. Prerequisite: CS 5400. (3Sp)

6500. Advances in Parallel Systems. Survey of current advances in parallel processing and concurrent systems. Review of current scientific literature to understand current issues, problems, and progress in advanced topics of parallel processing. Students read, summarize, report, and discuss up-to-date scientific papers in the field. Prerequisite: CS 5500. (3Sp)

6550. Parallel Computing Systems. Design of large-scale parallel systems. Explores machine organizations SIMD and/or MIMD modes of parallelism, emphasizing interconnection patterns among processors. Discussion of low-level parallel processing algorithms. Presents case studies of existing and proposed systems. Prerequisite: CS 5500. (3F)

6600. AI: Advanced Intelligent Systems. Investigation of advanced techniques for creating intelligent systems. Covers machine learning, reasoning under uncertainty, decision making, natural language understanding, and advanced knowledge representation. Students develop projects in LISP and expert system shells. Prerequisite: CS 5600. (3Sp)

6650. AI: Advanced Techniques in Pattern Analysis and Machine Intelligence.

Advanced course in theories and techniques of machine intelligence, emphasizing pattern recognition, computer vision, robotics, fuzzy logic, and neural networks. Prerequisite: CS 5650. (3Sp)

6690. AI: Advanced Topics in Artificial Intelligence (Topic). Advanced course in selected theories and techniques of artificial intelligence. Prerequisite: Permission of instructor. (3Sp)

6700. Object-Oriented Models, Methods, and Tools. Study of object-oriented concepts, principles, techniques, development processes, and tools across all areas of software engineering, with special emphasis on current research topics. Prerequisite: CS 5700. (3F)

6800. Theory of Relational Databases. Graduate-level relational database course covering constraints and normal forms, mathematical models and provable properties, minimality, graphs, and synthesis. Prerequisite: CS 5800. (3Sp)

6900. Seminar. Series of one-hour seminars on current research topics presented by computer science faculty. Prerequisite: Permission of instructor. (1F)

6950. Reading and Reports. Directed reading on advanced topics in computer science. Prerequisite: Permission of instructor. (3-6F,Sp,Su) ®

6970. Thesis and Research. Graduate research in computer science. Prerequisite: Permission of instructor. (3-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. Prerequisite: Permission of instructor. (3-6F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Interdepartmental Program in
Ecology

Acting Director: Professor *Martyn M. Caldwell*
Office in Natural Resources 342
Administrative Office in Natural Resources 314, (435) 797-2555

Degrees offered: Master of Science (MS) and Doctor of Philosophy (PhD) in the following departments: Biology; Fisheries and Wildlife; Forest Resources; Geology (MS only); Plants, Soils, and Biometeorology; and Rangeland Resources

Graduate Program

The ecology program at Utah State University is administered by the interdepartmental Ecology Center. Its goals are to promote research and graduate education in the science of ecology and to provide expert, professional information and advice for decision makers considering actions that affect the environment. The research carried out by the center's associates covers the full spectrum of ecology on several continents, but most of it is centered in the montane and desert regions of the western United States.

Students earn their degrees in ecology while maintaining residence in one of the participating departments; the center itself does not grant degrees. The candidate selects and is assigned a major professor from the department appropriate to his or her interests.

Degree Requirements

Requirements for graduate degrees in ecology include the University and departmental degree requirements, as well as the Ecology Center requirements outlined below, which are formulated by the Ecology Center Faculty Advisory Committee. This committee is comprised of faculty representatives, designated by the respective department heads, from the departments of Biology; Fisheries and Wildlife; Forest Resources; Geography and Earth Resources; Geology; Plants, Soils, and Biometeorology; and Rangeland Resources. The Ecology Center director chairs the committee.

The ecology MS and PhD are research degrees requiring a research thesis or dissertation. The following course requirements for each of these degrees fall into two categories. The first is a general science category. Students receiving graduate degrees in ecology are expected to have some breadth and sophistication in modern science. The second category includes ecology course requirements. These are for the most part general requirements, with the specific courses taken by each student selected by his or her graduate committee and tailored to his or her needs and professional goals.

Ecology MS and PhD Degrees General Science Requirements

Mathematics, Chemistry, Physics, and Computer Science

By its very nature, ecology must draw upon knowledge from most branches of science. As a result, at least a reasonable facility with fundamental mathematics and physical sciences must be attained by students, since these concepts have expression throughout the sciences. In order to assure a minimal comprehension in these areas, students receiving graduate degrees in ecology are required to have had the following at some point in their university careers:

1. Equivalent of mathematics through one semester of calculus.
2. Equivalent of at least a one-semester overview course in physics.
3. Chemistry through organic.
4. One year of introductory statistics and one graduate-level statistics course.

These courses are the minimum requirements for the MS and PhD degrees. The committee strongly recommends developing greater facility by taking at least a full year of calculus; one or more courses from the set of three including linear algebra, differential equations, and multi-variable calculus; and a full year of professional-level physics.

Biology

The following are required of all ecology graduate students, and must be taken at some point during their university career:

1. Genetics or evolution, one course.

2. One course in animal physiology for students emphasizing animal ecology.

3. One course each in plant physiology and soils for students emphasizing plant ecology.

Ecology Course Requirements

Master of Science

1. Attendance in Ecology Seminar (Biol 6870, FW 6870, FR 6870, or RLR 6870) is required each semester in residence.

2. A one-semester course in Graduate General Ecology (Biol 6960, FW 6960, FR 6960, or RLR 6960) is also required.

3. One course must be taken in each of three blocks. The following functional (core) blocks, listed alphabetically, are available:

Functional (Core) Blocks

Animal Behavior (Biol 6260)
Animal Community Ecology (Biol 6590)
Animal Ecophysiology (Biol 6520, FW 6300)
Animal Population Biology (FW 6850)
Ecosystem Ecology (Biol/FR/WS/Soil 6200)
Environmental Biophysics[1]
Evolutionary Ecology (Biol 6270)
Freshwater Ecology (FW 6100)
Landscape Ecology (FW 6700)
Plant Community Ecology (FR/RLR 7420)
Plant Ecophysiology (RLR 7150)
Plant Population Biology (RLR 7300)

[1]Graduate course in this area is under development.

Doctor of Philosophy

1. Attendance in Ecology Seminar (Biol 6870, FW 6870, FR 6870, or RLR 6870) is required each semester in residence.

2. A one-semester course in Graduate General Ecology (Biol 6960, FW 6960, FR 6960, or RLR 6960) is also required.

3. One course must be taken in each of five blocks. Students continuing from the MS to the PhD degree can apply block courses taken for the MS degree to the PhD requirement.

Department of
Economics

*College of Agriculture and College of Business**

Head: Professor *Keith R. Criddle*, resource economics and quantitative methods
Office in Business 615, (435) 797-2310

FAX (435) 797-2701
E-mail rvazquez@b202.usu.edu
WWW http://www.usu.edu/~economic/

Professors *DeeVon Bailey*, agricultural economics; *Basudeb Biswas*, international trade and economic development; *Herbert H. Fullerton*, agricultural and regional economics; *Terrence F. Glover*, production economics and policy; *E. Bruce Godfrey*, agricultural and resource economics; *Gary B. Hansen*, manpower economics and industrial relations; *L. Dwight Israelsen*, comparative systems and economic history; *John E. Keith*, agricultural and resource economics; *W. Cris Lewis*, regional-urban and managerial economics; *Kenneth S. Lyon*, economic theory; *H. Craig Petersen*, regulation and antitrust and managerial economics; *Donald L. Snyder*, agricultural and resource economics; *Morris D. Whitaker*, international economics and development; **Professors Emeriti** *Roice H. Anderson, Larry K. Bond, Rondo A. Christensen, Lynn H. Davis, Reed R. Durtschi, Allen D. LeBaron, Darwin B. Nielsen, N. Keith Roberts*; **Associate Professors** *Amitrajeet A. Batabyal*, microeconomic theory and natural resource economics; *Christopher Fawson*, public finance and econometrics; **Associate Professor Emeriti** *Glenn F. Marston*; **Assistant Professors** *David M. Aadland*, macroeconomics and applied econometrics; *Kevin Xiaodong Huang*, macro and monetary economics, financial economics, and international economics; *Lynn Hunnicutt*, industrial organization and business strategies; *Quinn R. A. Weninger*, microeconomic theory and natural resource economics; **Human Resources Specialist** *Marion T. Bentley*, manpower economics; **Lecturers** *Tyler J. Bowles*, econometrics and international economics; *Sarita Mohapatra*, international economics

Degrees offered: Bachelor of Science (BS) in Agribusiness Management; Bachelor of Arts (BA) in International Agribusiness; BS, Master of Science (MS), and Master of Arts (MA) in Agricultural Economics; BS, BA, MS, MA, and Doctor of Philosophy (PhD) in Economics; Master of Community Economic Development (MCED); participates in Master of Social Sciences (MSS); Economics is also offered as an undergraduate **dual major** for students whose principal major is in the College of Business; the Agribusiness major is structured to provide a dual major in Business.
Undergraduate emphases: *BS, BA in Economics*–Prelaw, Managerial, and Traditional Economics

*The Department of Economics is in the College of Agriculture and the College of Business. Programs in both the College of Agriculture and the College of Business are offered.

Undergraduate Programs

Objectives

The objective of the Department of Economics is to provide students with the intellectual framework and reasoning ability necessary to understand and analyze economic problems and to make informed decisions. A basic understanding of economics is essential to becoming a well-informed citizen, as well as a successful business or public leader.

Requirements

Admission. Freshmen who meet the admission requirements and are accepted in good standing by the University are eligible for admission to the College of Agriculture, the College of Business, and the Department of Economics. All transfer students, whether transferring from within Utah State University or from other colleges and universities, must have an overall minimum GPA of 2.2 to be accepted as majors in the department.

New students wishing to major in the Department of Economics may do so by listing one of the departmental majors on their application when they apply for admission to USU. Students enrolled at USU may change to a departmental major by applying directly to the College of Agriculture, the College of Business, or the Department of Economics.

An "advising and orientation flag" has been installed in the central computer used for registration at USU. Before new students, including freshmen and transfer students, can register for classes, this flag must be released. In order to have the flag released, each student must do one of the following: (1) attend a summer orientation, advising, and registration session on campus; or (2) request an orientation and advising packet by mail through the Academic Services Office at (435) 797-1128, or (800) 432-8615.

GPA Requirements. To graduate in Agribusiness Management, a student must have an overall GPA of 2.5 or higher, as well as a minimum GPA of 2.5 in Economics courses. An overall GPA of 2.5 or higher is required for admission into some required BA and MHR courses. All prespecialization and additional required courses listed below must be taken for a letter grade.

To graduate in any specialization within Economics, a student must have an overall GPA of 2.2 or higher, as well as a minimum GPA of 2.2 in Economics courses.

Bachelor's Degree in Economics

To receive a bachelor's degree in Economics, students must complete all University requirements and the college and departmental requirements for their specific major as noted below. Econ 2250, 3900, and 4250 *cannot* be used to meet economics elective requirements.

College of Business Prespecialization Courses: Econ 1000, 1500, 2010; Acct 2010, 2020; BIS 2450, 2550; MHR 2990; Math 1050, 1100; Stat 2300; Psy 1010 or Soc 1010.

Departmental Requirements:

Prelaw Emphasis: Econ 3400, 4010, 4020, 5100, 5950; six credits of Econ electives; PolS 1010, 1100; six credits of PolS electives.

Managerial Emphasis: Econ 3400, 4010, 4020, 4310, 5330, 5950; six credits of Econ electives; MHR 3110; BA 3400, 3500, 3700.

Traditional Emphasis: Econ 3400, 4310, 5000, 5010, 5100, 5330, 5950; twelve credits of Econ electives.

Economics as a dual major with principal major in the College of Business: Econ 3400, 4010, 4020; two of the following: Econ 4310, 5100, 5110, 5330, 5400, 5500, 5600, 5650.

Teaching Major in Economics

Economics Requirements: Econ 4010, 4020, 5100, and 5110.

Teacher Certification Requirements: *Level 1, First Semester, Junior Year*–BIS 3000, 3300, 3400, InsT 3000, ScEd 3100, 3200; *Level 2, Second Semester, Junior Year*–SpEd 4000, ScEd 4100, 4200, BIS 4300, 4400; *Level 3, First Semester, Senior Year*–ScEd 5100, 5200, 5300, BIS 5500, 5600.

Bachelor's Degree in Agricultural Economics, International Agribusiness, and Agribusiness/Business Dual Majors

To receive a bachelor's degree in one of the three majors listed above, students must complete all University requirements and the departmental requirements for their major as noted below:

Common Departmental Requirements:

Econ 1500, 2010, 3400, 4030; Acct 2010; BIS 2450; Math 1050, 1100; Stat 2300.

Specific Departmental Requirements:

Agribusiness Management Major with Dual Major in Business: Econ 4010, 4020, and three of the following economics courses: Econ 5020, 5030, Econ 5050 or 5350; MHR 2990, 3110, 4890; BA 3400, 3500, 3700; Acct 2020; BIS 2550.

Agricultural Economics Major: Econ 4310, 5000, 5010, 5020, 5030, 5050, 5330, 5950; Acct 2020; MHR 2990; and one of the following: BIS 2550 or ASTE 3050.

International Agribusiness Major: Econ 4010, 4020, 5030, 5050, 5120, 5350, 5400, 5950; NFS 5510; PlSc 4300; ASTE 6140. Score of 3 or better on the Federal FSI Test or completion of a language minor.

Minor Requirements:

Economics Minor: Econ 1500, 2010, 3400; Econ 4020 or 5000; Econ 4010 or 5010.
Economics Teaching Minor: Econ 1500, 2010, 3400, 5100, 5110; BIS 3000, 3300 or 4300, 4400.
Agribusiness Minor: Econ 1500, 2010, 2040, 4030; Acct 2010.
Agricultural Economics Minor: Econ 1500, 2010, 4010, 4030, 5030.

Additional Information

For more information about bachelor's degree requirements,

see the major requirement sheets available from the Department of Economics.

Financial Support

The Department of Economics, the College of Agriculture, and the College of Business award scholarships in addition to those available through the University Financial Aid Office. Information and application forms may be obtained from the department office.

Graduate Programs

Application Requirements

See general admission requirements, pages 60-61. Applications for graduate study from students trained in disciplines other than economics are welcomed. Generally, such applicants are required to enroll in intermediate macroeconomics, microeconomics, and mathematical economics as prerequisites to entering the degree program. Prospective students should also have completed the equivalents of undergraduate courses in college algebra, introductory calculus, and statistics. Applicants are also expected to have strong written and oral communications skills as should be developed in any substantive undergraduate program.

Degree Requirements

Doctor of Philosophy in Economics. To obtain a PhD in Economics, a student must meet requirements for admission to candidacy, prepare a dissertation, and pass the final dissertation examination.

As minimum prerequisites, students considering the PhD program in economics should have taken the following courses by fall of their first full year of study: Econ 5000, 5010, 5310, and 5330 (or their equivalents).

Admission to candidacy is granted upon completion of the following: (1) Econ 6000, 6010, 6060, 6310, 6320, 6430, 6440, 7000, 7010, 7330; (2) three of the following field areas including: (a) Industrial Organization (Econ 6200, 7200); (b) Resource Economics (Econ 6550, 7550); (c) International Economics (Econ 6400, 7400); (d) Environmental Economics (Econ 6560, 7560); (e) Development Economics (Econ 6800, 7800); (f) Market Analysis (Econ 6030, 7030); (3) courses, as determined by the student's supervisory committee, taken from the following areas: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, and (g) labor/human resources; (4) successful performance on a written qualifying examination covering economic theory which **must** be taken the spring semester following the first full year of study; and (5) preparation of a dissertation prospectus and approval by the Graduate Committee.

Master of Science and Master of Arts in Agricultural Economics. *Option I: Traditional Program*. To qualify, a student is required to earn a minimum of 30 credits to include the following: (1) Econ 5000, 5010, 5310 (or their equivalent) as prerequisites (not applied toward degree); (2) Econ 6000, 6010, 6030, 6060, 6310, 6320, 6430, 6440; (3) at least one additional course (6000 level or above) from: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, (g) labor/human resources, (h) econometrics, and (i) economic theory; (4) 6 credits for a thesis or 2 credits for a Plan B paper; and (5) successful completion of a final examination.

Option II: Agribusiness Specialization. To qualify for this Plan C degree, a student is required to earn a minimum of 36 credits to include the following: (1) Econ 5000, 5010, and 5310 (or their equivalent) as prerequisites (not applied toward degree); (2) Econ 6000, 6010, 6030, 6060, 6310, 6320, 6330, Acct 6010, and BA 6420; (3) at least four additional courses (three of which are 6000 level or above) from at least two areas including: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, (g) labor/human resources, (h) econometrics, and (i) economic theory; and (4) successful completion of a final examination.

Master of Science and Master of Arts in Economics. *Option I: Traditional Program.* To qualify, a student is required to earn a minimum of 30 credits to include the following: (1) Econ 5000, 5010, 5310 (or their equivalent) as prerequisites (not applied toward degree); (2) Econ 6000, 6010, 6060, 6310, 6320, 6430, 6440; (3) at least two additional courses (one of which is 6000 level or above) from: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, (g) labor/human resources, (h) econometrics, and (i) economic theory; (4) 6 credits for a thesis or 2 credits for a Plan B paper; and (5) successful completion of a final examination.

Option II: Managerial Economics Specialization. To qualify for this Plan C degree, a student is required to earn a minimum of 36 credits to include the following: (1) Econ 5000, 5010, 5310, 5330 (or their equivalent) as prerequisites (not applied toward degree); (2) Econ 6000, 6010, 6060, 6200, 6310, 6320, Acct 6010, BA 6420; (3) Econ 6430, 6440; (4) at least three additional courses (two of which are 6000 level or above) from at least two areas including: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, (g) labor/human resources, (h) econometrics, and (i) economic theory; and (4) successful completion of a final examination.

Master of Community Economic Development. To qualify, a student is required to earn a minimum of 36 credits for a Plan B degree, to include the following: (1) Econ 5000 and 5010 (or their equivalents); (2) Econ 5300, 5400, 5500, 6060, 6090, 6330, 6850; (3) 2 credits for a Plan B paper; (4) successful completion of a final examination; and (5) 7 additional credits of approved courses from any of the following areas: Accounting, Business Administration, Economics, Management and Human Resources, Political Science, and Sociology. Possible courses from these areas include: (a) Acct 6010; (b) BA 6420; (c) Econ 5020, 5300, 5310, 5560, 5650, 5680, 6000, 6010, 6310, 6320, 6400, 6430, 6440, 6550, 6560, and/or 6800; (d) MHR 6510, 6550, and/or 6630; (e) PolS 6030, 6040, and/or 6180; (f) Soc 6100, 6150, 6200, 6230, 6310, 6630, 6700, 7250, and/or 7620.

Master of Social Sciences. This degree is an interdisciplinary program with a specialization designed for economics students. General requirements for the degree are found on pages 353-354. To qualify, a student is required to earn a minimum of 36 credits based on (1) a minimum of 16 credits in Economics, which must include Econ 5000, 5010, 6060, and 6330 (or their equivalent); (2) a minimum of 8 credits in (a) two social science minors or (b) one social science minor and one social science cluster; and (3) 2 credits in a comprehensive integrative experience or Plan B report. Areas of emphasis include: (a) quantitative methods, (b) history/comparative systems, (c) public finance, (d) trade/development, (e) agriculture, (f) natural resources, (g) labor/human resources, (h) econometrics, and (i) economic theory. The disciplines from which the minors or minor/cluster may be selected include two of the following: Anthropology, Business Administration, Computer Science/Instructional Technology, Family and Human Development, Geography, History, Management and Human Resources, Political Science, Psychology, Sociology, and Social Work.

Research

The department maintains an active and productive research program. All faculty members are involved in investigating problems in economics and agricultural economics. The results of this research are published regularly in professional journals, books, and other publications. Financial support for the departmental research program is provided by the Utah Agricultural Experiment Station, the colleges of Agriculture and Business, the Office of the Vice President for Research, and from outside funding sources. The Economics Research Institute provides support and coordination for some of the department's research activities. Generally, graduate students are an integral part of all departmental research programs.

Financial Assistance and Assistantships

The department offers a variety of teaching and research assistantships to qualified graduate students. These are awarded on a competitive basis, and all accepted students are considered eligible. While the department makes every effort to assist students in obtaining financial assistance, acceptance into department programs does not guarantee financial assistance.

Some graduate students with demonstrated ability to contribute to departmental teaching and research functions are provided with financial assistance. No financial assistance is given to PhD students not passing the first-year qualifying examination or to any graduate student not making satisfactory progress toward his or her degree.

Economics Courses (Econ)

1000. Business Orientation. Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (0.5F,Sp)

BAI 1500. Introduction to Economic Institutions, History, and Principles. Designed to build an understanding of economic institutions, history, and principles. Relationship between private and public sectors of U.S. economy. Analysis of major economic institutions, such as property rights, markets, business organizations, labor unions, money and banking, trade, and taxation. No prerequisites. (3F,Sp,Su) ©

2010. Introduction to Microeconomics. Designed to build an understanding of the economics of the marketplace from the perspectives of individual consumer and producer or business. Development and application of microeconomic principles to demonstrate the role and limitations of competitive markets in motivating socially efficient consumer, business, and public sector choices. Prerequisite: Econ 1500. (3F,Sp,Su) ©

2040. Economics of Agribusiness. Introduction to agricultural production marketing and trade. Prerequisite: Econ 1500. (3F)

2250. Introductory Internship. Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. (1-9F,Sp,Su) ®

3250. Discussions With Business Leaders. Students attend Partners in Business Program seminar sessions to examine new methods for improving performance in organizations. Repeatable to a maximum of 1.5 credits. (0.5F,Sp) ®

3400. International Economics for Business. Primary issues in international economics as applied to contemporary business problems. Topics include trade patterns and policies, capital markets, and technology transfer. Prerequisite: Econ 2010. (3F,Sp,Su)

3900. Independent Reading and Research. (1-3F,Sp,Su) ®

4010. Managerial Economics. Microeconomic principles applied to economic decision-making and policy formulation, with emphasis at the level of business firm and the individual consumer. Designed for undergraduate business and accounting majors. Credit will not be given for both Econ 4010 and 5010. Prerequisite: Econ 2010. (3F,Sp,Su)

4020. Macroeconomics for Managers. Macroeconomic analysis applied to forecasting and understanding fluctuations in the levels of income, employment, and production. Designed for undergraduate business and accounting majors. Credit will not be given for both Econ 4020 and 5000. Prerequisites: Econ 1500; Stat 2300. (3F,Sp,Su) ©

CI 4030. Agribusiness Finance. Financial considerations in organizing and operating farms, ranches, and agribusiness firms. Prerequisites: Econ 2010, 4010; Acct 2010. (3F)

4250. Advanced Internship. Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. (1-9F,Sp,Su) ®

QI 4310 (d5310).[1] Mathematical Methods for Economics. Review of single-variable calculus (differentiation and integration); multiple variable calculus (including the chain rule and implicit differentiation); optimization (unconstrained and constrained); linear algebra and applications (including linear programming). Economic applications. Prerequisites: Econ 2010; Math 1100 or its equivalent. (4F)

4950H. Senior Honors Thesis/Project. Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (3Sp)

5000. Macroeconomics. Analysis of underlying causes of unemployment, economic instability, inflation, and economic growth. Credit will not be given for both Econ 4020 and 5000. Prerequisites: Econ 1500, Stat 2300. (3F,Sp,Su) ©

5010. Microeconomics. Analysis of behavior of consumers and business firms. Application of theory to the solution of real world problems. Credit will not be given for both Econ 4010 and 5010. Prerequisite: Econ 4310. (3Sp,Su) ©

CI 5020. Economics and Public Policy. A study of selected federal policies and their impacts on product and factor markets, with major focus on an economic analysis of public policy actions. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3Sp)

5030. Agricultural Marketing and Price Analysis. Agribusiness market strategies and price analysis. Designed for upper-division students. Prerequisite: Econ 4010 or

5010. (3F)

5050. Farm and Ranch Planning and Analysis. Economic principles and tools in operation of farm and ranch enterprises. Designed for upper-division students. Prerequisite: Econ 4010 or 5010. (3F)

5100. History of Economic Thought. Origin and development of economic theories of leading thinkers in western civilization. Prerequisite: Econ 2010. (3Sp)

5110. Economic History of the United States. Development of agriculture, industry, transportation, and finance from colonial times. Prerequisite: Econ 2010. (3F)

5120. Economics of Russia and Eastern Europe, 9th Century to 21st Century. Development of the economics of Russia and Eastern Europe from earliest times to the present, emphasizing the interaction between economic forces and policies of the state. Prerequisite: Econ 2010. (3F)

5150. Comparative Economic Systems. History, economic theories, and comparative policies of communist, socialist, and capitalistic economies. Problems facing transition economies. Prerequisite: Econ 2010. (3Sp)

5300. Industrial Organization. Emphasizes market structure, firm conduct, and economic efficiency. Topics include competition, the structure-conduct-performance paradigm, contestable market theories, monopoly and other noncompetitive market structures, and industrial organization and anti-trust policy in the United States. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3F)

QI 5310 (d4310). Mathematical Methods for Economics. Review of single-variable calculus (differentiation and integration); multiple variable calculus (including the chain rule and implicit differentiation); optimization (unconstrained and constrained); linear algebra and applications (including linear programming). Economic applications. Prerequisites: Econ 2010; Math 1100 or its equivalent. (4F)

5330 (d6330). Applied Econometrics. Designed for undergraduate economics majors and noneconomics graduate students. Includes application of basic statistics, simple linear regression, multiple regression, and simultaneous equations to economic models. Prerequisites: Stat 2300, 3000, or equivalent; Econ 5310/4310. (3F)

5350. Agribusiness, Cooperatives, and Management. Applications of economic and management principles to farm marketing and supply firms. Management teams operate computer-simulated farm supply firms in competition with each other. Prerequisite: Econ 4010 or 5010. (3Sp)

5400. International and Development Economics. Intermediate-level issues in international finance, development, and trade, including competitive and noncompetitive trade theory, trade policy, balance of payments accounting, exchange rates, international lending and investment, economic growth, and poverty alleviation. Prerequisites: Econ 3400, Econ 4020 or 5000, Econ 4010 or 5010. (4F)

5500. Public Finance. Government fiscal institutions-expenditure programs, budget procedures, tax systems, debt issues, levels of government, and the issues surrounding their operations. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3F)

5560. Natural Resource and Environmental Economics. Economics of developing, managing, and conserving natural resources and the environment. Topics include resource use and conservation, environmental quality, public and private resource management, and valuation of nonmarket goods. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3F)

5600 (d6600). Financial Economics. Development of our present system of money, banking, and financial institutions. Analysis of central bank policy, capital markets, speculative markets, and portfolio theory. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3Sp)

5650. Introduction to Labor. Review of the development of labor-management relationships and the growth of trade unionism in the United States. Prerequisite: Econ 2010. (3F)

5660 (d6660). Training and Organizational Development. Theoretical basis for training and development in organizations. Practical experience in the design and development of training and other educational programs in an organizational setting. Prerequisites: Econ 2010 required for 5660; graduate standing required for 6660. (2Sp)

5670. Labor and Employee Relations. A comprehensive study of the bargaining process and scope of labor-management contracts, the day-to-day administration of agreements, and the major substantive issues in negotiations. Prerequisite: Econ 2010. (3F,Sp)

5680. Labor Market Policy. Labor force development and behavior, occupational choice and mobility, human capital formation, labor market information and institutions, and manpower policies. Prerequisite: Econ 2010. (3Sp)

5850 (d6850). Regional and Community Economic Development. Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models are also developed. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3F)

CI 5950. Senior Project. A current economic problem is identified and analyzed, bringing together other agricultural economics and economics course concepts and methods. (3Sp)

6000. Macroeconomic Theory I. Introductory graduate course for master's and PhD students. Topics include growth, macroeconomic fluctuations, monetary/financial economics, and open economy economics. Prerequisite: Econ 6310. (3F)

6010. Microeconomic Theory I. Introductory graduate course for master's and PhD students. Topics include theory of the consumer and firm, uncertainty, and welfare economics. Prerequisite: Econ 6310. (3F)

6030. Market Analysis I. Introductory graduate course in marketing and demand analysis. Prerequisites: Econ 6000, 6010, 6320, or consent of instructor. (2F)

6060. Research Methods. Instructs MS and PhD students in how to apply the scientific method to economic research and reports/theses. Prerequisites: Econ 6000 and 6010. (2F,Sp)

6090. Practicum in Community Economic Development. Capstone course for students in the Master's of Community Economic Development program. Consists of community economic development project and presentation. Prerequisite: Econ 5850/6850. (3F,Sp,Su)

6160. Integrative Pre-MBA Core. Integrates financial reporting, analysis, and markets; domestic and global economic and legal environments; creation and distribution of goods and services; and human behavior in organizations. Upon completion, students without undergraduate degrees in business are prepared to enter advanced MBA core. (18Su)

6180. Intrasession MBA Workshop. Intensive workshops designed to enhance the MBA experience. (0.5-1F,Sp,Su) ®

6200. Industrial Organization I. Introductory graduate course in industrial organization and game theory. Prerequisites: Econ 6000, 6010, 6320, or consent of instructor. (2Sp)

6250. Graduate Internship. Provides practical experience for graduate students. Prerequisites: Econ 6000, 6010, 6310, 6430. (1-3F,Sp,Su) ®

6310. Mathematical Economics I. Graduate course in mathematical economics, including advanced mathematical theory and techniques as applied to economics: optimization, comparative statics, operations research, dynamics, and differential equations. Prerequisite: Econ 5310 or equivalent. (3F)

6320. Mathematical Economics II. Continuation of Econ 6310, including optimization and Kuhn-Tucker conditions, envelope theorem and its application to

economics, dynamics, and optimal control. Prerequisite: Econ 6310. (3F)

6330 (d5330). Applied Econometrics. Designed for undergraduate economics majors and noneconomics graduate students. Includes application of basic statistics, simple linear regression, multiple regression, and simultaneous equations to economic models. Prerequisites: Stat 2300, 3000, or equivalent; Econ 4310/5310. (3F)

6400. International Economics I. Introductory graduate course in international economic theory and policy. Prerequisites: Econ 5400 or equivalent; Econ 6000, 6010, 6430, or consent of instructor. (2Sp)

6430. Econometrics I. Introductory econometric course for graduate students. Includes probability and distribution theory and the analysis of commonly-used and practiced techniques for estimating and testing linear econometric models. Prerequisites: Econ 5330 or equivalent, Econ 6000, 6010, and 6310. (3Sp)

6440. Econometrics II. Continuation of Econ 6430. Includes multiple regression, nonlinear regression, special estimation models, time series, and simultaneous equation systems. Prerequisite: Econ 6430. (3F)

6550. Resource Economics I. Introductory graduate course in natural resource economics and welfare economics. Prerequisites: Econ 5560 or equivalent; Econ 6000, 6010, 6320, and consent of instructor. (2F)

6560. Environmental Economics I. Introductory graduate course in environmental economics. Prerequisites: Econ 5560 or equivalent; Econ 6000, 6010, 6320, and consent of instructor. (2Sp)

6600 (d5600). Financial Economics. Development of our present system of money, banking, and financial institutions. Analysis of central bank policy, capital markets, speculative markets, and portfolio theory. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3Sp)

6660 (d5660). Training and Organizational Development. Theoretical basis for training and development in organizations. Practical experience in the design and development of training and other educational programs in an organizational setting. Prerequisites: Econ 2010 required for 5660; graduate standing required for 6660. (2Sp)

6670. Employee Relations and the Labor Movement. Comprehensive survey of union-management relationships, including labor markets and the labor movement, labor history and law, union organization and government, and contract negotiation and administration. Includes exercises and cases in negotiations and grievance processes. Prerequisite: MHR 6760. (3Sp)

6800. Economic Development I. Introductory graduate course in the economics of developing countries and their growth and transformation. Prerequisites: Econ 5400 or equivalent or consent of instructor; Econ 6000, 6010, 6430, or consent of instructor. (2F)

6850 (d5850). Regional and Community Economic Development. Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models are also developed. Prerequisites: Econ 4020 or 5000, Econ 4010 or 5010. (3F)

6900. Readings and Conference. Directed readings. Credits from this course toward any economics graduate degree require approval of the student's advisory committee, the department graduate committee, and the department head. Prerequisites: Econ 5000 and 5010. (1-3F,Sp,Su) ®

6910. Independent Research. Directed readings. Credits from this course toward any economics graduate degree require approval of the student's advisory committee, the department graduate committee, and the department head. Prerequisites: Econ 5000 and 5010. (1-3F,Sp,Su) ®

6970. Thesis Research. Master's level research. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. Master's level advisement. (1-2F,Sp,Su) ®

7000. Macroeconomic Theory II. Advanced PhD level course in macroeconomic theory, including dynamic macro models, economic growth, macroeconomic fluctuations, and monetary and financial economics. Prerequisites: Econ 6000, 6010, 6320. (4Sp)

7010. Microeconomic Theory II. Advanced PhD level course in microeconomic theory, including market structure and static games, dynamic games, information economics, and general equilibrium. Prerequisites: Econ 6000, 6010, 6320. (4Sp)

7030. Market Analysis II. Advanced graduate course in marketing and demand analysis. Prerequisites: Econ 6030, 7000, 7010, or consent of instructor. (2F)

7200. Industrial Organization II. Advanced graduate course in industrial organization, with emphasis on game theoretic analysis. Prerequisites: Econ 6200, 7000, 7010, or consent of instructor. (2Sp)

7330. Advanced Topics in Econometrics. PhD level course including advanced topics in the theory and application of econometric models in research. Prerequisite: Econ 6440. (3Sp)

7400. International Economics II. Advanced graduate course in international economic theory and policy. Prerequisites: Econ 5400 or equivalent; Econ 6400, 7000, 7010, or consent of instructor. (2Sp)

7550. Resource Economics II. Advanced graduate course in natural resource economics, dynamic models, and welfare economics. Prerequisites: Econ 5560 or equivalent; Econ 6550, 7000, 7010, and consent of instructor. (2F)

7560. Environmental Economics II. Advanced graduate course in environmental economics and the application of game theory to environmental problems. Prerequisites: Econ 5560 or equivalent; Econ 6560, 7000, 7010; and consent of instructor. (2Sp)

7800. Economic Development II. Advanced graduate course in the economics of developing countries, and the theory of growth and transformation. Prerequisites: Econ 6430, 6800, 7000, 7010, or consent of instructor. (2F)

7970. Dissertation Research. PhD dissertation research. (1-9F,Sp,Su) ®

7990. Continuing Graduate Advisement. PhD level advisement. (1-2F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Interdepartmental Doctoral Program in

Education (EdD, PhD)

Chairman: *Gerard R. Giordano,* Dean, College of Education
Office in Emma Eccles Jones Education 109, (435) 797-1437

Faculty: Faculty are listed with participating departments.

Degrees offered: Doctor of Education (EdD) and Doctor of Philosophy (PhD)

Graduate specializations: Business Information Systems and Education, Curriculum and Instruction, Research and Evaluation, and Special Education (EdD only)

Admission Requirements

See general admissions requirements on pages 60-61. In addition, admission to the program requires (1) evidence of receipt of a master's degree or equivalent coursework related to the area in which a student plans to work, or a statement of why admission is sought without a master's degree, (2) GRE verbal and quantitative scores at or above the 40th percentile, (3) evidence of writing competency, (4) a brief statement identifying the area of concentration and the specific area of program concentration to be followed, and (5) evidence from students in the Curriculum and Instruction specialty area of the PhD and from students pursuing an EdD degree that (a) they have or have held a valid school teaching certificate or its equivalent, and (b) they have a minimum of two years of teaching experience or the equivalent.

Degree Programs

The Doctorate of Education (EdD) degree program is intended for students who wish to be better prepared to: (1) understand educational research, curricular, and instructional concepts sufficiently to deal effectively with problems as administrators, supervisors, and curriculum specialists in public or private educational institutions and settings; and (2) teach in community colleges, four-year colleges, and universities.

The Doctorate of Philosophy (PhD) degree program is intended for students who wish to be better prepared to: (1) fulfill roles as college and university researchers and teachers in education and education-related fields; and (2) conduct and direct research and development activities in public or private educational agencies or in the corporate sector.

Specializations

Interdepartmental specializations are available in **Curriculum and Instruction** and **Research and Evaluation**. The **Curriculum and Instruction Specialization** prepares curriculum specialists and instructional leaders in school districts and state education agencies, professors in colleges of education, and subject area instructors in four-year or community colleges. Areas of concentration available are (1) Reading/Writing, (2) Math/Science, (3) Social Studies, (4) Instructional Leadership, (5) Early Childhood, and (6) Gifted/Talented.

The **Research and Evaluation Specialization** prepares graduates to evaluate the quality of educational programs, including the comparison of strengths and weaknesses of alternative programs; the revision, updating, and/or redirection of existing programs; and the analysis of related educational issues.

Two departments, the Department of Business Information Systems and Education and the Department of Special Education and Rehabilitation, offer departmental specializations. The Special Education specialization is for EdD students only.

The **Business Information Systems and Education Specialization** prepares students interested in careers as teachers or educational leaders in public schools and/or as faculty members in higher education. Possible areas of concentration include business information systems, communication, business and/or marketing education, and training and development. Other areas related to teaching business subjects may be approved by departmental graduate committees. Flexibility in program design through elective courses is provided.

The **Special Education Specialization** prepares personnel for positions in supervision, teacher training, program development, policy making, and research.

Course Requirements

To complete a doctorate degree, a minimum of 60 total credits are required for students with a master's degree, and a minimum of 90 total credits are required for students without a master's degree. A student must:

1. Complete a Unifying Program of Studies (6 semester credits) and a Research and Statistics Core (12 semester credits), as required of all doctoral students.

2. Complete a planned program of designated supporting electives, as designated by the specialization or by a department and approved by the student's supervisory committee.

3. Pass an eight-hour, written comprehensive examination. This exam must be satisfactorily completed before the student advances to candidacy and/or undertakes dissertation research.

4. Present at a professional conference and submit for publication an approved manuscript.

5. Complete and satisfactorily defend a doctoral research study directed and judged by a supervisory committee of faculty.

6. Complete all final requirements, as specified by an area of specialization, the College of Education, and the School of Graduate Studies.

Residency

The Doctorate of Philosophy degree (PhD) requires three

semesters of full-time registration in residency, with a minimum of two semesters of consecutive residency. Completion of 33 credits in residence on the Logan campus is required.

The Doctorate of Education degree (EdD) requires at least three semesters in full-time residency, but they need not be consecutive. At least two semesters must be spent on campus prior to registering for dissertation credit. Completion of 39 credits must be completed in residence.

Research

Each student must complete a significant research study; present at a professional conference; and prepare an article for publication in an appropriate journal, based on the completed research and/or program of study.

Financial Assistance

Students should contact department heads for all inquiries regarding assistantships and tuition waivers. Applications for University assistantships, fellowships, and all financial aid are processed through departmental offices. Students desiring financial support should contact their department of affiliation prior to April 1.

Career Opportunities

The doctoral specialization prepares educational leaders for positions as college and university researchers and teachers in education and education-related fields. Recipients of the doctoral degree are also prepared to conduct and direct research and development activities in public or private educational agencies or in the corporate section; teach in community colleges, four-year colleges, and universities; serve as supervisors and curriculum specialists in public or private educational institutions and settings; and serve in a variety of other careers.

Additional Information

For more information, write to: Dean, College of Education, Utah State University, 2800 Old Main Hill, Logan UT 84322-2800 or to the heads of the participating departments.

College of Education Courses

Education courses are listed under the College of Education, pages 74-75.

Department of
Electrical and Computer Engineering

College of Engineering

Head: Professor *Richard W. Harris,* communications, signal processing
Office in Engineering Laboratory 149, (435) 797-2840

Graduate Program Coordinator: Professor *Robert W. Gunderson,* control systems, pattern recognition, robotics

FAX (435) 797-3054
E-mail info@ece.usu.edu
WWW http://www.ece.usu.edu/ece/

Professors *Doran J. Baker*, electromagnetics, infrared measurements, engineering systems in space; *Kay D. Baker*, electronics, space science; *Joe R. Doupnik*, communications, computers; *Linda S. Powers*, biophysics, molecular engineering; *Alan W. Shaw*, electromagnetics, controls, microcomputers; *Allan J. Steed*, electro-optics, aerospace measurement systems; *Gardiner S. Stiles*, parallel computing; *Ronald L. Thurgood*, computers, database systems; **Research Professors** *David A. Burt*, aerospace measurement systems; *James C. Ulwick*, aerospace physics; **Professors Emeritus** *Bertis L. Embry*, power systems; *Ronney D. Harris*, microwaves, transmission line circuits, atmospheric modeling; *William L. Jones*, integrated circuits; *Clair L. Wyatt*, infrared, electro-optical systems; **Adjunct Professors** *Frank T. Berkey*, atmospheric and space physics; *Douglas M. Chabries*, signal processing; *Allan Falconer*, natural resources, remote sensing, geographic information systems; *Boyd P. Israelsen*, microwaves; **Associate Professors** *Scott E. Budge*, signal processing, image processing; *Tony M. Carter*, VLSI; *John C. Kemp*, robotics, electro-optics; *Todd K. Moon*, communications and signal processing; *Charles M. Swenson*, atmospheric science and space engineering; *Paul A. Wheeler*, microprocessors, telecommunications, signal processing; **Research Associate Professors** *J. Steven Hansen*, computer signal processing; *Ronald J. Huppi*, electro-optics; **Adjunct Associate Professors** *Lloyd G. Allred*, neural networking; *Heng-Da Cheng*, pattern recognition, image processing; *Roy W. Esplin*, electro-optics, infra-red systems; **Associate Professor Emeritus** *Duane G. Chadwick*, remote sensors, instrumentation; **Assistant Professors** *Ben A. Abbott*, computer engineering, real-time and embedded systems; *Cynthia M. Furse*, microwaves, E&M, numerical simulation methods; **Research Assistant Professor** *Larry L. Jensen*, instrumentation and measurements; **Adjunct Assistant Professors** *Chien-Min Huang*, image processing; *Kyminh Liang*, image processing; *Yilin Weng*, VLSI, chip design, solid state; **Adjunct Research Assistant Professors** *L. Carl Howlett*, aerospace electronics and electro-optics, *Paul D. Israelsen*, VLSI, electronics

Degrees offered: Bachelor of Science (BS), Master of Engineering (ME), Master of Science (MS), Electrical Engineer (EE), and Doctor of Philosophy (PhD) in Electrical Engineering; BS in Computer Engineering

Graduate specializations: Atmospheric and Space Sciences, Communications, Control and Optimization, Infrared and Optical Systems, Microelectronics (VLSI), Microwaves (MMIC), Parallel Computers and Digital Systems, and Signal Processing

Undergraduate Programs

Objectives

The Department of Electrical and Computer Engineering offers a balanced curriculum of classwork, laboratory work, and design experiences to prepare students for careers as practicing engineers. The Bachelor of Science programs in Electrical Engineering and Computer Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The research program of the department, which includes undergraduates as well as graduate students, is internationally acclaimed in the fields of aerospace instrumentation and measurements, image compression, and robotics.

The overriding goal of the electrical and computer engineering curriculum is to integrate mathematics, science, engineering, and computer skills, along with communication and social skills, to enhance the productivity and creativity of the engineer. Engineering design, including open-ended problems, is included throughout the curriculum and concludes with a major engineering design experience, which also requires both verbal and written communication skills. Studies in the humanities and social sciences serve not only to meet the objectives of a broad education, but also to meet the objectives of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision making process.

The electrical engineering program gives each student a solid foundation in electricity, electronics, signals, and systems, with individual practical experience. Upon this basic foundation the students then build expertise in advanced areas, stressing actual design practice, to prepare them for productive engineering careers. The specialty areas can be categorized into the following: analog and digital electronics, controls, signal processing, communications, and microwave engineering.

The computer engineering program builds a solid program in computing hardware and software. The program begins with a strong foundation in electricity, digital logic design, and programming, then leads into advanced software engineering and microcomputer systems. Advanced courses provide experience in formal design methods, high-performance architectures, data communications, parallel computing, and real-time and embedded systems. Students are also required to complete advanced course sequences in computer science.

Students in the BS programs in both electrical engineering and computer engineering are permitted and encouraged to take courses in the other program. Many courses, such as controls, digital signal processing, and robotics, draw heavily on skills in both areas.

In cooperation with other departments, all ECE students are encouraged to complete one or more minors in appropriate fields, such as mathematics, physics, or computer science. Dual degrees are also possible with many departments.

General departmental goals for the next five to ten years are as follows: (1) foster and develop meaningful interaction with students, providing an atmosphere which gives them meaningful academic, professional, and life experiences; (2) provide students with the highest quality instruction and education in the fundamentals of electrical and computer engineering, emphasizing "hands-on" practical and real-life laboratory experiences; (3) maintain contact with alumni and industrial partners to ensure that the academic curriculum is responsive to societal needs; (4) provide relevant and meaningful design experiences, beginning with design emphasis in a freshman course and proceeding to a capstone design experience in the year-long senior design series; (5) develop strong oral and written communication skills; and (6) strive, as faculty members, to be examples of professional electrical and computer engineers, with outstanding ethical standards, showing concern for and nurturing students, while helping to build quality engineers for the future.

Within the electrical engineering program, specific goals are: (1) provide a solid foundation in the physics and mathematics underlying electrical phenomena; (2) develop the skills necessary to analyze complex problems; (3) develop sound approaches to the design of analog and digital systems; and (4) provide experience with state-of-the-art applications in electromagnetics, electronics, signals, and control and communication systems.

Specific goals of the computer engineering program are to (1) build the foundations of mathematics, computer science, and digital logic necessary for the development of computing systems; (2) provide experience in the analysis of algorithms and digital hardware; (3) develop advanced rigorous design methods in software and hardware; and (4) provide experience with modern software and hardware systems.

Requirements

Prior to entry into the upper-division classes, the student must meet the standards for entry into the Professional Engineering Program. Additional information concerning these items is given in the College of Engineering write-up (pages 77-78). It is the responsibility of students to be aware of these rules and procedures; however, adviser assistance is available.

Bachelor of Science in Electrical Engineering. The program leading to a Bachelor of Science degree in electrical engineering is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Elective courses providing for one or more areas of technical specialization, communication skills, and University Studies (General Education) complete the program and prepare the student for a productive and rewarding career in the electrical engineering profession.

Bachelor of Science in Computer Engineering. The program leading to a Bachelor of Science in computer engineering is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Elective courses providing for one or more areas of technical specialization, communication skills, and University Studies (General Education) complete the program and prepare students for productive and rewarding careers in the computer engineering profession.

Required Courses are shown in the accompanying paragraphs; however, because of differences in high school or transfer student preparation, it is strongly recommended that students meet with the college academic adviser to plan a detailed

semester-by-semester schedule for completing the preprofessional requirements. Particular attention must be paid to course prerequisites, requiring some students to take longer than four semesters to complete the preprofessional program. Students transferring into the department should consult with the college academic adviser for transfer credit evaluation and proper placement in the curriculum.

AP and CLEP credit may be used to meet some of the required technical and University Studies courses. Details concerning courses acceptable as electives are available from the Electrical and Computer Engineering Department.

Electrical Engineering

Preprofessional Program

Math 1210, 1220, 2250, 5710; CS 1700, 1720; Engr 1010; ECE 1020, 2410, 2530; Phyx 2210, 2220; Engl 2010; Math/Science Elective; University Studies Breadth

Professional Program

Math 2210; ECE 3170, 3410, 3420, 3530, 3610, 3710, 3820, 4310, 4660, 4840, 4850; Electrical Engineering Electives; Technical Electives; University Studies Depth

Computer Engineering

Preprofessional Program

Math 1210, 1220, 2250, 3310; CS 1700, 1720, 2200; Engr 1010; ECE 1020, 2410, 2530; Phyx 2210, 2220; Engl 2010; Math/Science Elective; University Studies Breadth

Professional Program

Math 5710; ECE 3410, 3530, 3610, 3710, 3720, 3780, 3810, 4740, 4820, 4830; Computer Engineering Electives; Computer Science Electives; Technical Electives; University Studies Depth

Student Research Opportunities

The academic disciplines are given meaningful application as part of the University's commitment to human, atmospheric, water, energy, and ecological resources, and to the exploration of space. Numerous motivated students, undergraduate as well as graduate, are given exciting hands-on experience on projects, such as working with instruments being flown on the Space Shuttle. USU's world-famous space program was spawned by the Electrical and Computer Engineering Department. Programs are also active in digital systems, parallel computing, robotics, computer and communications networks, optics, large-scale integrated circuits, real-time and embedded systems, and data compression.

Several research units are associated with the Electrical and Computer Engineering Department. The Center for Space Engineering conducts research primarily in infrared energy measurements and advanced instrumentation development and performs rocket and satellite measurements of upper atmospheric and space phenomena. The Center for Atmospheric and Space Sciences performs theoretical analyses and carries out experiments in the study of the physics and chemistry of the terrestrial atmosphere and magnetosphere and of the solar system. Image compression is currently a major focus in the department. Graduate students have opportunities in developing algorithms, VLSI chips, and printed circuit subsystems for use in image compression systems. The digital systems laboratory conducts undergraduate and graduate research in the development of digital systems, with emphasis upon microprocessor applications. The Center for Self-Organizing and Intelligent Systems works on the development of autonomous robotic vehicles. The National Center for the Design of Molecular Function unites the disciplines of engineering and molecular biology to develop tools for environmental detection and analysis. The Utah Water Research Laboratory, the Biological and Irrigation Engineering Department, and the Electrical and Computer Engineering Department are active in high-tech water resource management.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the department employs students to assist in engineering research and development.

Graduate Programs

Admission Requirements

See general admission requirements on pages 60-61. Applicants with a bachelor's degree in Electrical or Computer Engineering from an ABET accredited program and having a 3.25 GPA or better can generally be admitted without restriction. Additional coursework in electrical and computer engineering fundamentals may be required in individual cases. Students must take the general GRE exam; however, the subject GRE is not required. All graduate students are expected to have a working knowledge of a computer language (preferably C).

Applications will be considered throughout the year. However, students who wish to be considered for financial aid should submit applications by December 15 for the next academic year beginning in August.

No applications will be considered until all required information arrives in the office of the School of Graduate Studies.

Degree Requirements

The graduate program of courses can be grouped into the areas of (1) computer architecture and digital systems; (2) information, communications, and controls; and (3) electro-magnetics and electro-optics. Specific requirements for the ME, MS, EE, and PhD degrees are outlined below; these are in addition to the general requirements of the School of Graduate Studies.

Master of Engineering and Master of Science. Successful completion of 30 credits of 5000-level or above graduate-level coursework is required. Students must successfully complete 12

credits (excluding thesis and seminars) in the Electrical and Computer Engineering Department graduate program at the 5000 level or above. Both a depth and breadth in coursework must be demonstrated as follows: (1) demonstrate depth by completing two different two-course sequences at the 6000 level or above, and (2) demonstrate breadth by completing courses in four different areas. Two of these breadth courses may be at the 5000 level and two of them may be satisfied by the first two courses in the depth requirement.

Successful completion of 15 credits (excluding thesis and seminars) at the 6000 level or above in Electrical and Computer Engineering and related fields (e.g., Mathematics, Physics, Computer Science, or Mechanical and Aerospace Engineering) is required. The 6000-level credits required in the depth requirement above may be part of the 15 credits for this requirement. Some 5000-level mathematics courses may be approved as part of the 15 credits.

The MS degree has two options. Under Plan A (preparation of a full thesis), successful completion of a minimum of 6 and a maximum of 9 credits of thesis (ECE 6970) is required. Under Plan B (preparation and submission of a paper for publication), successful completion of 3 credits of thesis (ECE 6970) and a minimum of 3 and a maximum of 6 credits of design project (ECE 6950) are required. Thesis and Design Project credit do not satisfy the depth or breadth requirements.

The ME degree does not require a thesis, but requires two 5000-level or above courses with a laboratory.

A course in technical and professional writing, or equivalent writing experience, is required for MS students prior to beginning the thesis. MS students may, at the discretion of their supervisors, be required to hire an editor to bring the thesis or paper into acceptable form.

If a student is funded for his or her master's degree program by a fellowship or research funds, he or she is expected to complete the MS degree. If a student (funded or not) chooses an MS degree, changing to the ME degree is only possible by approval of the major professor, ECE graduate committee, and the department head.

Electrical Engineer. The Electrical Engineer degree is awarded for the successful completion of an advanced program of 60 credits of academic work beyond the BS, or 30 credits beyond the MS, and a comprehensive engineering report earning an additional 10 credits. The degree requirements are the same as those for the PhD listed below, except that the comprehensive examination need not be taken and the engineering report is given in lieu of the original research dissertation, reducing the total credits required for the PhD. The degree differs from the PhD by preparing the student for professional engineering work, rather than for research.

Doctor of Philosophy. The PhD is awarded for the successful completion of an advanced program of academic work and original research. A flexible program is planned individually by each candidate in consultation with his/her faculty supervisory committee.

The PhD program is expected to include 40 credits of classwork beyond the BS degree, plus 20 credits of dissertation research. The coursework generally represents two years of study beyond the MS degree, with up to 20 credits being taken outside the Electrical and Computer Engineering Department. For acceptance into the PhD program, applicants should have the equivalent of an MS from an accredited program in the United States, preferably in fields related to electrical or computer engineering. In the department's Outreach Program, cooperative graduate research efforts have been made with industry.

Once the student has completed at least 45 and not more than 60 credits, he or she must pass a comprehensive examination based on graduate-level courses. Near the end of the program, the results of the original (publishable) research work will be presented and publicly defended as a dissertation earning an additional 30 credits (ECE 7970).

Research

The faculty lead research programs offering students experience in a variety of specialized topics which involve state of the art engineering, field work, and project management. The department is internationally recognized for its work in space engineering, image compression, and autonomous robotic vehicles. Major research programs are associated with the Electrical and Computer Engineering Department through the Center for Space Engineering, which coordinates graduate research with industry, government, and on-campus laboratories, including the Space Dynamics Laboratory, Center for Atmospheric and Space Sciences, the Center for Self Organizing and Intelligent Systems, and the National Center for the Design of Molecular Function. Research in these laboratories and centers is conducted on atmospheric space science and space instrumentation, including infrared sensors, linear and nonlinear control systems, neural networks, parallel processing, computer networking, real-time computer controls, communications, and image processing.

Many faculty members and students are working with experiments carried on the space shuttle. These projects range from small packages developed by the students to major experiments supported by teams of engineers and scientists. Opportunities exist in these programs for student participation.

The department also has research programs in VLSI, computer networking, parallel processing, MMIC, robotics, microwaves, and signal processing. Interdisciplinary programs have been developed with other engineering departments; with the departments of Physics, Chemistry and Biochemistry, and Mathematics and Statistics; and in agriculture and water resources areas.

Financial Assistance

All applicants who are accepted academically are automatically considered for financial aid. Virtually all successful graduate students in the department do receive some level of financial aid during their degree program.

Electrical and Computer Engineering Courses (ECE)

1020. Introduction to Electrical and Computer Engineering. Introduction to analog and digital electrical circuits. Basic circuit devices, electrical theory and applications, computer number systems, combinational logic circuit design, electrical instruments and measurements, and computer simulation of circuits. Laboratory work required. (3F,Sp)

2200. Electrical Engineering for Nonmajors. Introduction to electrical engineering, including DC circuits, electronic circuits, digital circuits, and power circuits. Not for

ECE majors. Three lectures, one lab. Prerequisite: Math 1210. (4F)

2410. Electrical Circuits. Circuit theory, analysis techniques, design, and applications. Operational amplifiers, inductive and capacitive circuits, AC and transient analysis, frequency response, computer-aided analysis, measurements and use of laboratory instruments. Three lectures, one lab. Prerequisite: ECE 1020. (4F,Sp)

2530. Digital Circuits. Design of combinational and sequential logic circuits with discrete and programmable logic devices. Simulations and timing analysis. Use of CAD tools (Powerview and ABEL). Design of digital systems. Three lectures, one lab. Prerequisite: ECE 1020. (4F,Sp)

3170. Transmission Lines and Electromagnetic Fields and Waves. Discussion of Maxwell's equations, electromagnetic waves, power and energy, reflection and refraction processes, transmission lines, waveguides, and antennas. Explores electrostatic and magnetostatic fields produced by charge and current distributions, as well as electromagnetic forces and materials. Laboratory work required. Prerequisites: ECE 2410, Phyx 2220. (4F)

QI, DSC 3260. Science of Sound. Application of principles of acoustics (study of sound) to everyday life. Explores physical acoustics, psychoacoustics, musical acoustics, electroacoustics, architectural acoustics, and environmental acoustics. Uses algebra and reasoning to solve problems in acoustics. (3F)

3410. Electronic Systems I. Fundamentals of transistors, operational amplifiers, and other integrated circuits, along with their utilization in amplifiers, switches, and other applications. Laboratory work required. Prerequisite: ECE 2410. (3F,Sp)

3420. Electronic Systems II. Design of electronic circuits for applications in instrumentation, communication, control, and power systems. Three lectures, one lab. Prerequisite: ECE 3410. (4Sp)

3530. Digital System Design. Presents modern top-down, bottom-up approach to design of digital systems, emphasizing programmable devices. Extensive use of CAD tools. Designing with ABEL, and introduction to designing with Verilog HDL. Laboratory work required. Prerequisite: ECE 2530. (3F,Sp)

3610. Signals, Circuits, and Systems. Analysis of continuous and discrete signals in linear circuits and systems. Differential and difference equations. Laplace, Z, and Fourier transforms. Applications in circuits, communications, and control systems. Prerequisites: ECE 2410; Math 5710 (taken concurrently). (4F,Sp)

3710. Microcomputer Hardware and Software. Synthesis of microcomputer systems, including interfacing, component analysis, signaling requirements, and programming. Covers architecture basics, including instruction sets, assembly language programming, loading, timing, and interrupts. Includes hands-on implementation. Three lectures, one lab. Prerequisites: ECE 2530 and CS 1720. (4F,Su)

3720. Microcomputer Systems Progamming. Advanced assembly language and systems programming concerned with performance and I/O. Study of modern computer architecture issues, such as caching, pipelining, concurrent instruction execution, memory access time, and role and structure of device drivers. Prerequisite: ECE 3710. (3Sp)

3780. Engineering Software. Methods for development of reliable engineering software. Includes experience with modern CASE tools. Prerequisite: CS 1720. (3Sp)

3810. Computer Engineering Design I. Students select an engineering design project for completion during their senior year. Project proposal, including technical description of the project and management plans, is required. Speaking skills emphasized through formal presentation of the proposal. Prerequisite: Professional standing. (1Sp,Su)

3820. Electrical Engineering Design I. Students select an engineering design project for completion during their senior year. Project proposal, including technical description of the project and management plans, is required. Speaking skills emphasized through formal presentation of the proposal. Prerequisite: Professional standing. (1Sp,Su)

4250. Internship/Coop. Planned, career-related work experience in industry. Students must register with USU Co-op Office and have program approved by the ECE co-op adviser. Written report required. Prerequisite: Professional standing. (3F,Sp,Su) ®

4310. Control Systems I. Study of analog and computer controlled systems, classical and modern control system design methods, s-domain and z-domain transfer function models, state space, dynamics of linear systems, and frequency domain analysis and design techniques. Introduction to controllability and observability, and full-state pole placement controller design. Laboratory work required. Prerequisite: ECE 3610. (3F)

4660. Communication Systems I. Principles of analog and digital communications theory and systems. Signal analysis amplitude and angle modulation. Survey of communication systems. Digital communication concepts and performance. Laboratory work required. Prerequisites: ECE 3610, Math 5710. (3F)

4740. Computer and Data Communications. Systems approach to computer and data communications. Includes transmission lines, hardware controllers, computer interfaces, and protocols relating to local and wide area networks. Prerequisite: ECE 3720. (3F)

CI 4820. Computer Engineering Design II. Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Design reviews and written progress reports required. Prerequisite: ECE 3810. (3F)

CI 4830. Computer Engineering Design III. Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Written and oral reports required, describing technical details of design project. Prerequisites: ECE 4820 and senior standing. (3Sp)

CI 4840. Electrical Engineering Design II. Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Design reviews and written progress reports required. Prerequisite: ECE 3820. (3F)

CI 4850. Electrical Engineering Design III. Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Written and oral reports required, describing technical details of design project. Prerequisites: ECE 4840 and senior standing. (3Sp)

4930. Special Studies for Undergraduates. Independent or group study of engineering problems not covered in regular course offerings. (1-3F,Sp,Su) ®

5130. Computational Techniques in Electromagnetics. Application of numerical methods, including numerical integration and differentiation, finite difference frequency domain, finite difference time domain, method of moments, and finite element method. Programming projects include analysis of microstrip lines, wire antennas, scattering and absorption, and shaped magnets. Prerequisites: ECE 3170, 3610, and C/C+/C++ programming. (3Sp)

5230. Spacecraft Systems Engineering. Spacecraft communications, telemetry systems, and command and data handling. Introduction to astrodynamics and orbit design. Electrical power generation and storage. Spacecraft subsystems (e.g., guidance, navigation, and control). Prerequisites: Either ECE 2200, or *both* ECE 2410 and 2530. (3F)

****5270. Electronic Music Engineering.** Engineering analysis and design of electronic music systems. Includes acoustics of musical instruments, analog and digital synthesizers, and M101 Protolab. Laboratory work required. Prerequisite: ECE 3260. (3F)

***5280. Sound System Design.** Sound system design based on engineering

principles. Includes measuring parameters in the acoustic environment, designing the power amplification system, and selecting microphones and loud speakers. Laboratory work required. Prerequisite: ECE 3260. (3F)

5310. Control Systems II. Modern control system design, including full-state and reduced-state estimators, compensator design and the separation theorem, tracking systems, and disturbance suppression. Introduction to linear quadratic optimal controller design and real-time control system design, describing function methods for nonlinear systems. Three lectures, one lab. Prerequisite: ECE 4310. (4Sp)

5430. Advanced Electronic Circuits. Analysis, design, and application of analog integrated circuits in electronic systems. Laboratory work required. Prerequisite: ECE 3420. (3F)

5460. Digital VLSI System Design I. Team-oriented design of large digital systems using hardware description languages. Schematic capture and standard-cell libraries. Behavioral system modeling and simulation. Preparation of behavioral models for floor-planning, testability, and design synthesis. Extensive use of CAD tools. Design project. Prerequisite: ECE 3530. (3F)

5470. Digital VLSI System Design II. Continuation of ECE 5460. Logic synthesis, timing analysis, and structural simulation and back annotation. Design refinement to the point of final mask artwork production. Design validation through LVS, DRC, and gate-level or device-level simulation. Formal methods of circuit verification. Extensive use of CAD tools. Design project. Prerequisite: ECE 5460. (3Sp)

5630. Introduction to Digital Signal Processing. Theory and principles of digital signal processing, including discrete-time signals and systems, Z-Transforms, Fourier analysis, FIR and IIR digital filter design, discrete Fourier transforms, and multi-rate processing. Laboratory work required. Prerequisite: ECE 3610. (3F)

5640. Real-Time Processors. Real-time processor architectures and methods used for digital signal processing. Includes C and assembly language programming, modern DSP architectures, tools for real-time system development, and finite word-length effects. Laboratory includes implementation of hardware-based real-time systems. Laboratory work required. Prerequisites: ECE 3710 and 5630. (3Sp)

5660. Communication Systems II. Concepts from digital communications. Multidimensional signal spaces, linear and nonlinear modulation, and associated bandwidths. Detection and matched filtering; synchronization. Prerequisite: ECE 4660. (3Sp)

5750. Computer Architecture I. Modern architecture fundamentals, instruction set analysis and design, pipelined and superscalar architectures, software-hardware interaction, memory hierarchy, and virtual memory stresses processor-specific low-level code optimization. Prerequisite: ECE 3710 or equivalent. (3F)

5760. Computer Architecture II. Storage and bus systems, interconnecting shared-memory and distributed memory multi-processors, and architectural support for multi-processors. Emphasizes small-scale, real-time, and embedded multi-processor systems. Provides substantial programming experience on such systems. Prerequisite: ECE 5750. (3Sp)

5770. Microcomputer Interfacing. Design of hardware and software interfaces to microcomputers for instrumentation and control applications. Three lectures, one lab. Prerequisite: ECE 3710. (4Sp)

5780. Real-Time Systems. Real-time system design and implementation of basic concepts, including interrupts and controllers, context switch, concurrent processes, semaphores, message passing, rate monotonic and deadline scheduling, hardware system design and test issues, and typical engineering practice. Includes hands-on implementation. Three lectures, one lab. Prerequisite: ECE 3720. (4F)

5930. Special Topics in Electrical and Computer Engineering. Independent or group study of engineering problems not covered in regular course offerings. (1-4F,Sp,Su) ®

6010. Stochastic Processes in Electronic Systems. Introduction to stochastic processes in communications, signal processing, digital systems, and control. Topics include continuous and discrete random processes, correlation and power spectral density, optimal filtering, Markov chains, and queuing theory. Prerequisites: Math 5710 and ECE 3610. (3F)

6110. Photonic Systems Engineering I. Generation of coherent and incoherent light by lasers, luminescent sources, and light-emittting diodes. Transmission of light through conventional optical components, lenses, apertures, imaging systems, waveguides, and optical filters. Modulation, switching, and scanning optoelectronic devices. Amplification, frequency conversion, nonlinear materials, and photodetectors. Prerequisite: ECE 3170 or Phyx 3600. (3F)

6130. Microwave Engineering I. Theory of operation and design techniques for passive microwave components, such as transmission lines, waveguides, power dividers/combiners, and filters. Active microwave components, such as amplifiers, oscillators, mixers, and multipliers. Design of microwave monolytic integrated circuits in Silicon and Gatts. Prerequisite: ECE 3170. (3Sp)

6140. Microwave Engineering II. Design of microwave systems. Combination of passive and active components, mixers, and oscillators. Students design complete transmitter or receiver system. Taught on demand. Prerequisite: ECE 6130. (3)

6150. Advanced Electromagnetics I. First-year graduate-level electromagnetics concepts, methods and analyses of generation, radiation, and reception of waves in various media at frequencies throughout the electromagnetic spectrum. Incorporates computer-aided techniques. Prerequisite: ECE 3170 or Phyx 3600. Taught on demand. (3)

6170. Antennas and Radiation. Theory and application of electromagnetic radiation and radiating structures. Emphasis on structures for modern wireless communications. Laboratory work required. Prerequisite: ECE 3170. (4F)

6240. Space Environment and Engineering. Study of space environment and models used for engineering analysis. Topics include considerations for engineering in the space environment, such as plasma interactions, debris, chemical reactions, radiation effects, and thermal issues. (3Sp)

6250. Graduate Internship/Co-op. Planned work experience in industry. Detailed program; must have prior approval. Written report required. (1-3F,Sp,Su)

6290. Fundamentals of Acoustics. Principles underlying generation, transmission, and reception of acoustic waves. Applications of these principles using analytical methods to attack acoustic problems. Taught on demand. (3)

6320. Control Theory I. Methods of optimization, estimation, and control of linear deterministic and stochastic systems. Linear quadratic regulator design, Kalman filters, dynamic programming applications of calculus of variations, and separation theorems. Prerequisite: ECE 5310. (3F)

6330. Control Theory II. Methods of nonlinear and adaptive control system design and analysis. Includes qualitative and quantitative theories, graphical methods, frequency domain methods, sliding surface design, linear parameter estimation methods, and direct and indirect adaptive control techniques. Prerequisite: ECE 6320. (3Sp)

6340. Spacecraft Attitude Control. Spacecraft attitude dynamics and controls. Spin stabilized, three axis, and dual spin modes. Attitude determination techniques. Prerequisite: ECE 5310. (3F)

6450. Device-Level Digital VLSI Design. VLSI fabrication technologies and device modeling. Layout design rules and mask artwork CAD tools. Techniques for estimating parasitic capacitance and resistance. Transistor-level circuit implementation and analysis techniques for digital circuits. Timing analysis. Modeling of submicron devices. Focus on CMOS technology. Extensive use of CAD tools. Prerequisites: ECE 2410 and 2530. (3F)

***6460. Device-Level Analog VLSI Design.** Analog device characterization. Current sinks, sources, mirrors, and amplifiers. Current and voltage references, comparators, and operational amplifiers. A/D and D/A conversion. Specialized layout techniques to deal with on-chip device variance. Focus on CMOS technology. Extensive use of CAD tools. Prerequisites: ECE 5430 and 6450. (3Sp)

****6470. Semiconductor Device Physics.** Semiconductor materials, and their

physical and electronic properties. Detailed device models for metal-semiconductor contacts, p-n junctions, bipolar transistors, and field-effect transistors. Introduction to fabrication technology, including crystal growth and doping, diffusion, exitaxy, ion-implantation, and lithography. Prerequisite: ECE 6450. (3Sp)

6600. Computer Networking I. Topics include network topology, flow, capacity and queuing analysis, detailed description of the standard layers, and specific networking systems, including local area networks. Some lab work included. (3F)

6620. Introduction to Digital Image Processing. Digital processing theory and techniques for two-dimensional signals. Topics include two-dimensional transforms, image perception, sampling, modeling, and enhancement. Prerequisites: ECE 5630 and 6010. (3Sp)

6660. Digital Communications and Signal Processing. Topics in digital communications, including signaling in band-limited channels, equalization, synchronization, and fading channels or spread spectrum. Prerequisites: ECE 5660, 6010. (3Sp)

***6750. Concurrent Systems Engineering I.** Reliable and efficient software design for multiprocessor and multithreaded applications on real-time or embedded systems. Use of CASE tools to develop substantial concurrent programs for single and multiprocessor systems. Prerequisite: BS in Electrical and Computer Engineering or Computer Science. (3F)

****6760. Fault-tolerant Systems.** Methods for design and implementation of fault-tolerant computer systems, emphasizing small real-time and embedded applications. Detection, assessment, confinement, and treatment of faults. Checkpointing, rollback, and secure protocols. Fault-tolerance on distributed systems. Prerequisite: BS degree in Electrical and Computer Engineering or Computer Science. (3F)

***6770. Real-Time Operating Systems.** Both low- and high-level design and implementation of real-time operating systems. Provides hands-on experience with embedded real-time operating system. Introduction to scheduling tradeoffs. Survey of current commercial real-time operating systems. Prerequisite: ECE 5780. (3Sp)

****6780. Device Drivers.** Design and implementation of UNIX and Windows device drivers. Includes hardware/software design tradeoffs in light of modern operating systems. Students implement working device drivers. Prerequisite: ECE 5780. (3Sp)

6800. Electrical Engineering Colloquium. Weekly seminars or colloquia. (1F) ®

6930. Special Topics in Electrical Engineering. Independent or group study in electrical engineering topics, such as automated systems, optics and laser engineering, electro-acoustics, solid-state materials, devices, and intelligent systems engineering. (1-6F,Sp,Su) ®

6950. Design Project. (3F,Sp,Su) ®

6970. Thesis Research, MS. (1-6F,Sp,Su) ®

7120. Photonic Systems Engineering II. Design of electro-optical devices and optoelectronic systems, including characterization, analysis, and calibration and validation of optical, radiometric, spectrometric and/or imaging sensors and instruments. Prerequisite: ECE 6110 or approval of instructor. Taught on demand. (3)

7160. Advanced Electromagnetics II. Design of devices and systems, including oscillators, amplifiers, radiators, transmission systems, receivers, and radar and communication systems. Taught on demand. Prerequisite: ECE 6150 or instructor's approval. (3)

7210. Spacecraft Instrumentation. Theory, engineering, and data reduction techniques of spacecraft instrumentation for space science and spacecraft systems. Taught on demand. (3)

****7350. Advanced Control Theory I.** Intelligent control strategies, including neural network, fuzzy logic, associated memory networks, and rule-based control systems. Prerequisite: ECE/MAE 6320 or instructor approval. (3F)

7360. Advanced Control Theory II. Advanced methods of nonlinear systems analysis, including: H-infinity methods, QFT methods, extended Kalman state estimators, nonlinear separation theorem, and bounded input-bounded output methods. Taught on demand. (3)

7610. Computer Networking II. Advanced TCP/IP protocols, routing strategies, major applications. Details of Unix systems for advanced use of BSD sockets and TLI/Streams. Prerequisite: ECE 6600. (3Sp)

7620. Advanced Digital Image Processing. Advanced digital processing theory and techniques. Topics include image restoration, image reconstruction from projections (computed tomography), and data compression. Prerequisite: ECE 6620. To be taught Fall 2000. (3F)

***7630. Optimal and Adaptive Filtering Techniques.** Optimal and adaptive filtering techniques for digital signal processing. Topics include Wiener and Kalman filters, least mean-square adaptive filters, frequency domain adaptive filters, and recursive least-squares adaptive filters. Prerequisites: ECE 5630, 6010. (3F)

****7640. Spectral Estimation and Array Processing.** Spectral estimation and array processing of digital signals. Topics include parametric, nonparametric, and eigenanalysis methods of spectral estimation, as well as spatial signal processing methods for beamforming and angle-of-arrival estimation. Prerequisite: ECE 5630, 6010. (3F)

7660. Detection and Estimation Theory. Study of detection theory, including Neyman-Pearson and Bayes. Also considers estimation theory, including maximum likelihood and Bayes. Application to communication, pattern recognition, synchronization, and controls. Prerequisite: ECE 6010. Taught on demand. (3)

****7670. Coding Theory and Practice in Communication.** Examination of codes employed in digital communications, including discussion of error correction codes over finite fields. Reed-Solomon, convolutional, and trellis coding. Advanced coding techniques. Prerequisite: ECE 6660. (3Sp)

7680. Information Theory. Topics related to information theory, including source coding theorem with examples of data compression, channel coding, and rate distortion theory. To be taught Spring 2001. Prerequisite: ECE 6660. (3Sp)

***7710. Concurrent Systems Engineering II.** Advanced work on the development of reliable and correct concurrent systems, including those with time constraints. Substantial experience with CASE tools and application development. Prerequisite: ECE 6750. (3Sp)

****7720. Modeling and Simulation of Discrete Systems.** Deterministic and probabilistic modeling of discrete systems, emphasizing single and multiple processor computer systems. Mathematical models and queuing systems. Discrete event simulation. CAD tools for computer-system modeling. Prerequisites: Probability and statistics; any of ECE 6750, 6760, 6770, 6780. (3Sp)

7740. Real-Time Scheduling. Classic real-time scheduling from a mathematical basis. Includes rate monotonic, deadline, value-based, slack-based, and job shop flow scheduling problems. Advanced research topics in real-time scheduling, including adaptive, multi-processor, and stochastic techniques. Prerequisites: ECE 5780, 6010. To be taught Fall 2000 and 2001. (3F)

****7750. Distributed Control Systems.** Design and implementation issues concerning distributed control systems. Real-time processing, distributed stability methods, network techniques and standards, system development and management, smart sensors, and control actuators. Survey of current literature. Prerequisites: ECE 4310 and 5780. (3F)

7760. Advanced Topics in Distributed Systems. Advanced topics in parallel and distributed computing, emphasizing small-scale real-time and embedded systems. Prerequisite: ECE 6750. Taught on demand. (3)

7770. Advanced Topics in Real-Time Systems. Survey of current real-time systems

research. Covers topics such as scheduling, multiprocessor systems, fault tolerance, diagnostic systems, use of artificial intelligence techniques, and user interfaces. Prerequisite: ECE 5780. Taught on demand. (3)

7930. Special Topics in Electrical Engineering. Independent or group study in electrical engineering topics, such as automated systems, laser engineering, electroacoustics, solid-state materials, devices, and intelligent systems engineering. (1-6F,Sp,Su) ®

7970. Dissertation Research. (1-6F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Elementary Education

College of Education

Head: Professor *Jay A. Monson*, administration, gifted/talented education, social studies education
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Professors *Deborah A. Byrnes*, social studies education, early childhood; *Donald R. Daugs*, science education, curriculum development; *Bernard L. Hayes*, reading education; **Associate Professors** *James T. Dorward*, mathematics, research methods, middle level education; *Deborah E. Hobbs*, language arts, foundations, gifted and talented; *Francine Fukui Johnson*, foundations, gifted/talented education, supervision; *John A. Smith*, reading education, research methods; **Assistant Professors** *James J. Barta*, early childhood and mathematics; *Martha T. Dever*, foundations, early childhood education; *Scott L. Hunsaker*, gifted/talented education, foundations; *Rebecca M. Monhardt*, science education; *Martin K. Tadlock*, middle level education, foundations; *Martha L. Whitaker*, foundations; **Student Teaching Coordinator** *Kathleen O. Johnson*; **Advisers** *Sheri N. Noble, Sylvia Robinson, Mary Ann Warren*

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Elementary Education; BS and BA in Early Childhood Education; the Elementary Education Department participates in the Interdepartmental Doctoral Program in Education, including Doctor of Education (EdD) and Doctor of Philosophy (PhD) with Curriculum and Instruction Specialization

Graduate specializations: *MA, MS, MEd*–Early Childhood Education; Gifted and Talented Education; Math and Science Education; Middle Education; Reading, Writing, and Language Arts; Social Studies Education

Undergraduate Programs

Objectives

The purposes of the Department of Elementary Education are:
1. To develop professional educators;
2. To advance knowledge in the field of education.

These purposes are realized through teaching, scholarly activities, and service. The department provides leadership in the preparation of teachers, supervisors, curriculum specialists, and other professional personnel for careers in elementary education, early childhood education, and middle education.

The Department of Elementary Education at Utah State University offers three programs leading to certification as a teacher: (1) *Elementary Education:* Offers certification to teach in grades one through eight in the public schools; (2) *Early Childhood Education:* Offers certification to teach prekindergarten, kindergarten, and grades one through three in the elementary school; and (3) *Middle Education:* Offers an endorsement to teach in grades five through eight.

Requirements

Provisional Admission Process and Requirements. Since more students major in Elementary Education at USU than in any other major, competition for admission into the program is very keen. Due to increased demands for admission coupled with limited resources, a ceiling of 75 students has been placed on admissions each semester. Thus, admission to USU does not necessarily guarantee admission into the Elementary Education program.

Provisional admission to the Elementary and Early Childhood Teacher Education Program is determined by (1) the student's GPA in a set of three core courses, (2) ACT scores and Writing Diagnostic Test **or** PPST test results, (3) the number of credits a student has taken, and (4) successful completion of a group assessment evaluation. (Additional factors to be weighted may be gender and/or minority status consistent with applicable law.) Applications are accepted each semester. Because there are typically more applicants than there is space available, the number

accepted is limited. **Students who are not accepted may reapply.** Provisional admission requires formal action by the Office of the Dean of the College of Education, as well as by the student's department.

Admission to the teacher education program is a prerequisite for enrollment in Level II. A student desiring admission to this program should file an application in the Teacher Education Office, located in room 103 of the Emma Eccles Jones Education Building.

Elementary Education SODIA Program. The acronym SODIA represents the elementary teacher education program. The name is derived from the initial letter of descriptive words (Self, Others, Discipline, Implementation, and Application) which represent emphasis placed at each level of the program.

The elementary education SODIA program is performance-based and field-centered. It utilizes public schools as partners in each phase of the teacher education program. SODIA is an interdisciplinary and interdepartmental program utilizing staff members from the Departments of Psychology, Special Education and Rehabilitation, Family and Human Development, Health, Physical Education and Recreation, Music, Art, Theatre Arts, and Instructional Technology who work in conjunction with the Department of Elementary Education. These University faculty members work with teachers and principals of cooperating public schools and the Edith Bowen Laboratory School on the USU campus in an integrated program.

Level I, Self, is represented by the "S" in the acronym SODIA. This is the first-level course introducing the field of education and emphasizing the student's self-assessment in relation to ability and desire to teach. A minimum of 10 hours are spent observing in an elementary or middle school classroom and completing volunteer service in other community settings.

Level II, Others, is represented by the "O" in the acronym SODIA. This stands for the many "others" who make up the education community. In this bloc, each student receives 12 credits and is assigned as a teacher assistant in one of the public schools. The remainder of the time is spent in seminars and classwork offered on the USU campus.

Level III, Disciplines, is represented by the "D" in the acronym SODIA. Students in this bloc receive 15 credits and are assigned to classroom and seminar experiences at the Edith Bowen Laboratory School. The "methods" courses in reading, social studies, language arts, mathematics, and science are included in this bloc. A preliminary course in reading is required as a transition from Level II to Level III.

Level IV, Implementation, is represented by the "I" in the acronym SODIA. This is the student teaching or internship phase of the program. Student teaching constitutes full days of actual teaching experience for the full semester. Internships are for the full academic year.

Level V, Application, is represented by the "A" in the acronym SODIA. At this level, graduates of the program make a transition into the profession of teaching.

Program Strands also receive major emphasis through SODIA's levels of progression. These strands are: (1) Assessment, (2) Classroom Management, (3) Curriculum, (4) Effective Teaching, (5) Learner, (6) Parent and Community, (7) Diversity, and (8) Personal and Professional Development. A student performance portfolio assessment process is also included.

Continuing Status Requirements. A minimum GPA of 2.75 is required to remain in good standing and to graduate from the program.

All students majoring in elementary education must be registered in the College of Education. An adviser will be assigned from the Department of Elementary Education. Programs of professional education courses, as well as areas of breadth and professional depth emphasis in subject matter, have been developed by the Department of Elementary Education and approved by the Council on Teacher Education and the Utah State Office of Education. For a complete description of the program and requirements for graduation and certification, students should obtain a copy of the *Department of Elementary Education, Student Program Planning Guidebook*, available from the USU Bookstore.

Each student completes a professional semester of student teaching or a year of internship. An application for student teaching/internship must be made at least two semesters in advance, and credentials are reevaluated at that time. Not all student teachers/interns can be accommodated by the schools located within Cache Valley. Students should be financially prepared to spend that time off campus in the event such an arrangement is necessary.

Students who carefully select their elective courses may also qualify for a special endorsement to the basic professional teaching certificate. All students complete an area of professional depth emphasis in a subject matter field, in addition to the teaching breadth emphasis. Dual certification endorsement programs exist in communicative disorders, early childhood education, special education, and middle education. Information concerning special endorsements and additional areas of specialization may be obtained from the Department of Elementary Education.

Students who have teaching certificates in areas other than elementary education may obtain the elementary certificate by meeting the same or equivalent requirements for certification expected of an elementary education major. Those desiring to acquire dual certification should work with an adviser from the Department of Elementary Education.

All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis and the grade point average for these courses must be 2.75 or better. Major subject courses passed with less than a *C* grade must be repeated.

Additional Information

For more information concerning requirements for University graduation and for basic professional teaching certification in elementary education, early childhood education, and middle education, see major requirement sheets available from the Elementary Education Department Advisement Center, Emma Eccles Jones Education Building, Room 373.

Financial Support

The following scholarships are available to junior and senior students: Ballam, Bowen, Frye, Hales, Stewart, DeHart, Kurzhals, Jackson, Taylor, and Young (see pages 27-28). To be eligible, students must have completed Level II of the Elementary Education Program and have a cumulative GPA of 3.5 or higher. Applications are available from the Elementary Education Department and are due by March 1.

Graduate Programs

Admission Requirements

Students applying for admission to master's programs must have GRE scores at or above the 40th percentile. This same percentile is the minimum required on the MAT. For the doctorate degree, GRE scores at or above the 40th percentile are also required on the verbal and quantitative tests. Admission committees also consider experience, undergraduate record, curricula completed, and formal recommendations. One year of successful elementary school teaching experience is required for the master's program. Two years of teaching experience or the equivalent is required for admission to the doctoral program. Students with deficient oral or written English skills will be required to complete additional coursework to improve their skills.

Admission to graduate programs is contingent upon (1) completion of an application to graduate school and (2) recommendation by the department screening committee for the master's program or the management admissions committee for the doctoral program. In addition to the requirements of the School of Graduate Studies (see pages 60-61), letters of recommendation must be received from three professionals in education.

Degree Programs—On Campus

Three avenues exist for on-campus students wishing to pursue a master's degree in the Department of Elementary Education at Utah State University. They are as follows.

Master of Arts/Master of Science—Plan A. Students planning to pursue a future doctoral degree or wishing to follow a traditional master's degree should complete a Master of Arts or Master of Science (Plan A) degree. This is a 36-credit program, including 6 credits for the thesis. Educ 6570 is required as a research course (rather than Educ 6550). A copy of the Program of Study form listing other required core and professional option courses is available from the department office. A committee chair and two committee members will work with students pursuing the Plan A master's degree. Plan A students should submit an Appointment for Examination form to their major professor, committee, and the Graduate School at least five working days before the final examination is to be held.

Master of Education—Plan B. Students wishing to include a creative project as part of their master's degree program should enroll in the Master of Education (Plan B) program. Three credits will be given for ElEd 6960, Master's Creative Project. All MEd students will complete Educ 6550 (Research for Classroom Teachers, 3 credits) and other courses listed on the current Program of Study form. A committee chair and two committee members will work with students completing the creative project; however, the chairperson will have major responsibility in approving the proposal and primarily work as the program adviser, with the committee members being involved more directly in the presentation of the creative project.

Requirements for the Master of Arts degree include two years of an acceptable foreign language or the equivalent, as determined by testing arranged by the supervisory committee and approved by the department and the graduate dean. One year each, or the equivalent, of two languages is acceptable if approved by the student's committee.

Master of Education—Plan C. In order to provide another option for prospective elementary education master's degree students, the Department of Elementary Education conducts a Plan C option within its Master of Education Degree. The basic elements of a Plan C option include completion of 40 credits of prior approved graduate courses, completion of an exit paper, and an oral review.

The exit paper should be a pre-planned scholarly activity. It could be a paper discussing coursework applicability to the student's teaching assignment, or a written plan for changing curriculum and/or instruction drawing on coursework and the student's role, etc. The intent is that the exit paper be an integral part of the planned course of study and the student's assignment.

Educ 6550 (Research for Classroom Teachers, 3 credits) is required. A notice of intent to complete the degree must be filed with the School of Graduate Studies *at the beginning of the last semester of coursework.* A letter of completion should be filed by the committee chairperson upon successful completion of all requirements.

Degree Programs—Off Campus

Two avenues exist for students wishing to pursue a master's degree in the Department of Elementary Education at Utah State University primarily through Branch Campus/Continuing Education off-campus offerings. They are as follows.

Master of Education—Plan B. Off-campus students wishing to include a creative project as part of their master's degree program should enroll in the Master of Education Program. Three credits will be given for ElEd 6960 (Master's Creative Project). All MEd students will complete the required core and other courses listed on the current Program of Study form. A committee chair and two committee members will work with students completing the creative project; however, the chairperson will have major responsibility in approving the proposal and primarily work as the program adviser, with the committee members being involved more directly in the presentation of the creative project (oral exam).

Master of Education—Plan C. In order to provide another option for prospective off-campus elementary education master's degree students, the Department of Elementary Education conducts a Plan C option within its Master of Education Degree. The basic elements of a Plan C option include completion of 40 credits or prior approved graduate courses, completion of an exit paper, and an oral review.

The exit paper should be a pre-planned scholarly activity. It could be a paper discussing coursework applicability to the student's teaching assignment, or a written plan for changing curriculum and/or instruction drawing on coursework and the student's role, etc. The intent is that the exit paper be an integral part of the planned course of study and the student's assignment.

A notice of intent to complete the program should be filed by the student with the department and the School of Graduate Studies *at the beginning of the semester the candidate is to finish the degree.* A letter of completion should be filed by the committee chairperson upon successful completion of all requirements.

Doctoral Programs (PhD and EdD)

The department participates in the Interdepartmental Doctoral Program in Education, which includes the Doctor of Philosophy (PhD) and the Doctor of Education (EdD). For information about areas of specialization, emphasis of study, research sponsored, admission requirements, procedures to follow, and other information, see pages 177-178 of this catalog.

Additional Information

All students completing master's degrees in Elementary Education must enroll for a minimum of 15 credits *on the USU campus* (except students completing their degrees at one of the USU branch campuses or residence centers, including Vernal, Roosevelt, Moab, Price, and Snow College).

The Program of Study form for the appropriate degree and plan described above should be approved by the committee and submitted to the School of Graduate Studies *at least two months prior to the oral exam, oral review, or presentation appropriate to that degree.*

A master's degree must be completed within a six-year time limit. Pass/fail grades will be accepted only for seminars, special problems, interdisciplinary workshops, thesis or dissertation research, and continuing graduate advisement. A maximum of 12 workshop credits may be included. Transfer credit accepted toward a degree is normally limited to 9 credits; however, with prior approval, 18 transfer credits may be accepted. A maximum of 15 credits taken during one summer may be counted toward the degree. All coursework in education must be taken at the 6000 level or above, in order to be applied toward a graduate degree in the Department of Elementary Education. Coursework goes out-of-date after eight years.

Admission deadlines for students applying to graduate programs are: June 15 for fall semester, October 15 for spring semester, and March 15 for summer semester.

Research

Cooperation with other departments and research centers at the University, as well as with public school and State Office of Education collaborators, permits strong graduate programs in all phases of elementary education. Research opportunities are available with the Edith Bowen Laboratory School, cooperating school districts in Utah and surrounding states, the Utah State Office of Education, and the United States Department of Education.

Financial Assistance

Both departmental and School of Graduate Studies support are available for the regular academic program and are awarded on a competitive basis. Students requesting financial support should apply to the department by March 15. To be eligible for financial assistance, a student must attend USU full-time. No financial assistance is available for summer semester.

Assistantships. Teaching assistantships are available through the department. Some research assistantships are available through faculty members who have ongoing projects with off-campus funding agencies.

Students are not eligible for assistantships or any form of financial assistance from the University until all application procedures are completed and the student is formally admitted to a program of studies.

Acceptance to pursue graduate study does not guarantee the student financial assistance. Inasmuch as funds are limited, the assistantships are awarded by the department to cover specific teaching assignments and by the faculty to provide for research.

Doctoral students desiring information about financial assistance should write to: Coordinator, Doctoral Degrees, College of Education, 2800 Old Main Hill, Utah State University, Logan UT 84322-2800.

Career Opportunities

Positions in Higher Education—Master Teachers. Many school districts support and encourage teachers to further their education and expertise by obtaining a master's degree. Added financial remuneration generally accompanies the completion of such a degree. Supervisors, curriculum specialists, and other professional careers are enhanced by completion of a master's degree.

Completion of a doctorate degree qualifies the graduate for a wide variety of careers, including positions in higher education, curriculum specialist positions in school districts and state offices of education, positions in educational agencies of the United States government, and educational specialist positions in business and industry.

Elementary Education Courses (ElEd)

1000. Orientation to Elementary Education. Level I. Students assess themselves as prospective teachers. Students will also have an opportunity to do observations in the public schools (grades K-8) and complete volunteer service in other community educational settings. (3F,Sp)

CI 3000. Foundation Studies and Practicum in Teaching and Classroom Management Level II. Introduction to historical, philosophical, and social factors shaping contemporary educational practice in kindergarten, elementary, and middle school. Through these factors, students investigate various aspects of teaching and classroom management. Extensive practicum included. (6F,Sp) ®

3100. Teaching Reading I. Focuses on variety of approaches to reading instruction and issues in reading curriculum development. Includes reading theories, stages of reading growth, and assessment practices. Prerequisite: Admission to teacher education. (3F,Sp,Su) ©

4000. Teaching Science and Practicum Level III. Investigation and practical application of science programs, materials, and techniques of instruction to the teaching of science. Prerequisites: Completion of Level II and Biol 1010 with a lab, or USU 1310; Phyx 1200 and Geol 1100 or their equivalents. (3F,Sp,Su)

CI 4030. Teaching Language Arts and Practicum Level III. Study of language development in children, and its implication and application in a practicum setting. Curriculum development, instructional methods, and evaluation in the content areas of listening, speaking, writing, and reading. (3F,Sp,Su)

CI 4040. Teaching Reading II and Practicum Level III. Examines developmental, content, and recreational components of classroom reading programs, including teacher read-aloud, SSR, decoding, shared reading, uses of children's literature, content area reading, assessment, adaptive strategies, and parent involvement. Prerequisite: ElEd 3100. (3F,Sp,Su)

4050. Teaching Social Studies and Practicum Level III. Students develop necessary knowledge and skills to plan and implement an appropriate social studies program consistent with the nature of the child and our democratic society. Includes practicum work at Edith Bowen Laboratory School. Prerequisite: Admission to teacher education. (3F,Sp,Su)

4060. Teaching Mathematics and Practicum Level III. Relevant mathematics instruction in the elementary and middle-level curriculum; methods of instruction, evaluation, remediation, and enrichment. Prerequisite: Admission to teacher education. (3F,Sp,Su)

4250. Advanced Cooperative Work Experience. Advanced or middle level career-related experience designed to integrate classroom study with practical work experience. Students must work a minimum of 75 hours per credit hour. (1-8F,Sp,Su) ®

4410. Gifted Education in the Regular Classroom. Introduction to characteristics of gifted learners. Exploration of strategies for challenging gifted learners in regular classroom settings. (3F)

4420. Multiple Talent Approach to Thinking. Explores one model for the teaching of creative and critical thinking embedded in regular curricula. Includes practical application requirements. (2Sp)

4480. Early Childhood Education Kindergarten through Grade 3. Study of early childhood (K-3) curriculum, methodology, and learning environments. (3Sp)

4500. Gifted Education in the Regular Classroom. Provides introduction to characteristics of gifted learners. Explores strategies for challenging gifted learners in regular classroom settings. (3F)

4600 (d6600).[1] Philosophy and Organization of the Middle Level School. Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Taught summer of odd-numbered years. (3F,Su)

4610 (d6610). Curriculum, Methods, and Assessment for the Middle Grades. Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. Taught summer of even-numbered years. (3Sp,Su)

4620 (d6620). Service Learning Applications for the Middle Grades. Examines literature related to service learning for the middle grades. Application of service learning in curriculum. (3Su)

4900. Senior Project. All honors students are required to submit a senior project for graduation from the Honors Program. Students work with a departmental adviser on a topic of their choice. (1-5F,Sp) ®

4970. Senior Thesis. An in-depth paper or project culminating in a formal presentation. Required of all students for graduation from the Honors Program in Elementary Education. (1-5F,Sp) ®

5000 (d6000). Practicum in Improvement of Instruction. Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. (1-6F,Sp,Su) ®

5050. Student Teaching—Kindergarten. Constitutes 6 semester credit hours of student teaching in a kindergarten classroom. Student teachers need to demonstrate competency and professionalism in teaching. An understanding of developmentally appropriate curriculum is necessary. (6F,Sp) ®

5100. Student Teaching—Primary Grades (1-3). Constitutes 6 semester credit hours of student teaching in a primary grade (1-3). Student teachers will demonstrate competency in designing and implementing a developmentally appropriate learning environment. (6F,Sp)

5150. Student Teaching—Elementary (Grades 1-6). Constitutes a full semester of student teaching/seminar at the elementary level. Student teachers need to demonstrate competency and professionalism in teaching. Students begin their transition from university student to professional teacher. (6-12F,Sp)

5200. Student Teaching—Middle Level (Grades 7-8). Constitutes a full semester of student teaching/seminar at the middle school level. Student teachers need to demonstrate competency and professionalism in teaching. Students begin their transition from university student to professional teacher. (6-12F,Sp)

5250. Student Teaching—Seminar. Designed to provide student teachers/interns with teaching skills and strategies that will assist them in the classroom. Accompanies one of ElEd 5100, 5150, or 5200. Course content is implemented into the student teaching experience. (3F,Sp)

5300. Associate Teaching—Level V. Designed to allow students who have completed student teaching to extend their teaching time in a classroom. In order to better prepare for their own classroom, students continue to develop individual teaching skills and competencies. (3-6F,Sp)

5900. Independent Study. (1-2F,Sp,Su) ®

6000 (d5000). Practicum in Improvement of Instruction. Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. (1-6F,Sp,Su) ®

6040. Measurement and Evaluation in Education. Principles and techniques for developing, validating, and interpreting tests of student achievement and learning goals. (2F,Su)

6100. Motivation and Management in Inclusive Settings. Examines motivation and management principles, emphasizing at-risk and special needs children. Designed for regular education teachers, K-12. (2Su)

6150. Foundations of Curriculum. Examination of theories, principles, and foundations of curriculum, emphasizing program planning and current curriculum trends. (3F,Su)

6190. Theories of Teaching and Learning. Demonstration, analysis, and evaluation of various models of teaching, emphasizing research-based principles of learning. (3Sp,Su)

6200. Curriculum and Issues in Early Childhood Education. Examination of current issues and research topics in early childhood education important to the improvement of K-3 programs. (2Su)

6220. Workshop in Early Childhood Education. Exploration of current topics important in teaching young children. (1-6Su)

6230. Literacy Learning in Early Childhood. Investigation of developmentally appropriate instruction and the value of play relating to oral, print, and logico-mathematical literacy learning in kindergarten and the primary grades. Examination of relevant research. (2Su)

6240. Workshop in Science Education. Exploration of current topics in science education. (1-6Su) ®

6250. Graduate Cooperative Work Experience. Cooperative education work experience at a professional level. Prior approval required. (1-10F,Sp,Su) ®

6260. Supervised Practicum in Early Childhood Education. Encompasses approximately 125 hours of supervised practicum in a kindergarten classroom. Participants demonstrate their ability to integrate and apply early childhood theory and research in kindergarten. (2)

6300. Workshop in Mathematics Education. Exploration of current topics and methods in mathematics education. In the past, topics have included: relevant mathematics in rural settings, integration of mathematics and children's literature, and ethnomathematics. (1-6Su) ®

6310. Content Area Reading and Writing. Practical approaches for teaching reading/writing and learning skills to elementary, middle, and high school students, emphasizing ESL and cross-discipline teaching in all content areas. (2Su)

6320. Processes of Cognition and Reading. Examination of sociocultural theory and cognitive research related to the comprehension and production of written language. Exploration of implications for improved language acquisition and literacy instruction. (2Su)

6330. Utah Writing Project. Workshop, seminar, and institute experiences in the Utah Writing Project, focusing on writing process, principles, and research-based strategies for improving writing instruction in grades K-12. (1-6Su)

6340. Issues and Trends in Literacy. Exploration of current issues and instructional trends in the teaching of reading and writing. Emphasis on reading widely and critically in the professional literature. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary or middle school. (2F,Su) ®

6350. Reading Assessment and Diagnosis. Covers the correlates and diagnosis of reading problems, as well as methods and materials for remedial reading instruction. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary, middle, or secondary school. (3Sp)

6360. Reading Improvement and Remdiation. Designed to help classroom teachers update and enhance components of their reading instruction and assessment. Emphasizes development of balanced and comprehensive reading instruction program. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary or middle school. (3Su)

6370. Supervised Internship in Reading and Writing. Individual practicum experience designed to allow graduate students to implement and focus on one or more aspects of reading and writing instruction in a classroom or clinical setting. Prerequisite: Consent of instructor. (1-3)

6380. Improvement of Language Arts Instruction. Exploration of current topics and instructional practices in elementary language arts. Prerequisite: ElEd 4030 or teaching experience in elementary or middle school. (2F)

6400. Multiple Talent Approach to Teaching. Explores one model for embedding the teaching of creative and critical thinking in regular curricula. Includes practical application requirements. (2Su)

***6420. Education of Gifted and Talented Learners.** Provides multiple cultural and historical perspectives on giftedness and talent. Explores characteristics of gifted individuals, with emphasis on identifying needs. Provides general overview of possible services for gifted learners. Must be taken concurrently with ElEd/ScEd 6430. (2F,Su)

***6430. Practicum: Individual Case Study.** Practicum experience in association with ElEd/ScEd 6420. Requires intensive supervised study of gifts and talents of individual child of student's choice. Must be taken concurrently with ElEd/ScEd 6420. (1F,Su)

6440. Creativity in Education. Exploration of theories, research, and strategies concerning creativity, and their application to personal creativity and to improvement of classroom practice. (2Su)

6460. Identification and Evaluation in Gifted Education. Provides educators with theory and models for identifying students as gifted, creative, and talented. Presents models for evaluation of programs for gifted learners. Explores instruments for use in identification and evaluation. Must be taken concurrently with ElEd/ScEd 6470. (2Sp)

6470. Practicum: Team Consultation. Practicum experience in association with ElEd/ScEd 6460. Requires participation, as part of a consultative team, to improve practice in an approved setting for a specific child, classroom, school, school district, or other educational entity. Must be taken concurrently with ElEd/ScEd 6460. (1Sp)

6480. Methods and Materials in Gifted Education. Explores programming and curriculum models in gifted education, with special attention to the development of instructional materials for use with students. Must be taken concurrently with ElEd/ScEd 6490. (2F)

6490. Practicum: Classroom Applications. Practicum experience in association with ElEd/ScEd 6480. Requires application of at least three curriculum, cognitive, or affective models in the student's current teaching assignment. Must be taken concurrently with ElEd/ScEd 6480. (1F)

6500. Interdisciplinary Workshop. (1-2F,Sp,Su) ®

6550. Practicum in the Evaluation of Instruction. Field-based research study contributing toward graduate degrees. Supervisory certification related to assessment of ongoing or newly proposed program of instruction. (1-4F,Sp,Su) ®

6560. Practicum in Improvement of Instruction. Field-based program focusing upon characteristics of effective teaching methodologies, teaching performance, curriculum decision making, value guidelines, and the characteristics of the learner. (1-4F,Sp,Su) ®

6580. Character and Values Education. Overview of research, theory, and practical approaches to values education, emphasizing processes of moral development and socialization. (2Su)

6600 (d4600). Philosophy and Organization of the Middle Level School. Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Graduate students have additional course requirements for design and implementation of a project. Taught summer of odd-numbered years. (3F,Su)

6610 (d4610). Curriculum, Methods, and Assessment for the Middle Grades. Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. To receive credit for 6610, graduate students design and implement an action research project related to curricular or pedagogical interests, then share their findings in class. Project will include review of literature related to student's interest. Prerequisite: ElEd/ScEd 6600. Taught summer of even-numbered years. (3Sp,Su)

6620 (d4620). Service Learning Applications for the Middle Grades. Examines literature related to service learning for the middle grades. Application of service learning in curriculum. (3Su)

6700. Improvement of Science Instruction. For practicing classroom teachers. Considers a Science/Technology/Society approach to curriculum and instruction in science in the elementary school. Prerequisite: ElEd 4000 or teaching experience in elementary or middle school. (2F,Su)

6720. Practicum in Science Instruction. Optional practicum to be taken semester following enrollment in ElEd 6700. (1F,Sp)

6750. Improvement of Mathematics Instruction. Examines advanced concepts in curriculum theory and methods of teaching mathematics in the elementary and middle school. Prerequisite: ElEd 4060 or teaching experience in elementary or middle school. (2Sp)

6800. Improvement of Social Studies Instruction. Emphasizes study of newer concepts in curriculum and methods of instruction for elementary social studies programs. Designed for experienced teachers. Prerequisite: ElEd 4050 or teaching experience in elementary or middle school. (3)

6900. Independent Study. (1-2F,Sp,Su) ®

6910. Independent Research. (1-2F,Sp,Su) ®

6940. Supervision and Administration Internship. Provides experience in supervision and administration in school systems. (3F,Sp,Su)

6960. Master's Creative Project. Provides students with opportunity to design and carry out a creative project closely related to area of teaching specialty. Requires written report. (3F,Sp,Su) ®

6970. Thesis. Master's level research and thesis writing with guidance and criticism. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-9F,Sp,Su) ®

7020. Foundations and Change in Early Childhood Education. Survey course designed to acquaint professionals with historical and philosophical foundations of early childhood education, leading to examination of contemporary trends and issues. (3)

7050. Internship in Program Evaluation. Experience in practical aspects of program evaluation through planned, supervised evaluation project participation approved by student's supervisory committee. (1-4F,Sp,Su) ®

7060. Internship in Research. Experience in conducting research through planned, supervised research project participation approved by student's supervisory committee. (1-4F,Sp,Su) ®

7120. Student Teaching Supervision. Considers ways and means of providing desirable experiences for student teachers in the public schools. Analysis of roles of classroom teacher and college supervisor. (1-3F,Sp) ®

7330. Supervision Internship. Provides extensive supervisory experience for doctoral students. Internship is for period of time to be specified by department and cooperating agency. (2-9F,Sp,Su) ®

7350. Internship in Curriculum Development. Internship with recognized leaders in the development, implementation, and evaluation of curricular programs and activities at early childhood, elementary, and/or middle education levels. (1-4F,Sp,Su) ®

7500. Interdisciplinary Workshop. (1-2F,Sp,Su) ®

7550. Evaluation of Supervisory Performance. Program for graduate students to become acquainted with and demonstrate competency in supervision. (1-4F,Sp,Su) ®

7810. Research Seminar. Identification of research problem, consideration of research strategies and methods, application of research and statistical concepts in departmental focus, and interaction with faculty. (1F,Sp,Su) ®

7900. Independent Study. (1-2F,Sp,Su) ®

7910. Independent Research. (1-2F,Sp,Su) ®

7970. Dissertation. Individual work on research problems in PhD or EdD program. Emhasizes writing and editorial techniques. (1-9F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-9F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
English

College of Humanities, Arts and Social Sciences

Head: Professor *Jeffrey Smitten,* eighteenth-century British literature, Scottish literature, literary theory and criticism
Office in Ray B. West 201, (435) 797-2733

Associate Head: Professor *Christine Hult,* composition and rhetoric
Office in Ray B. West 205, (435) 797-2735

Director, Graduate Studies: Professor *Kenneth W. Brewer,* poetry and essay writing
Office in Ray B. West 310, (435) 797-3516

Director, Undergraduate Studies: Associate Professor *Theodore Andra,* medieval and nineteenth-century British literature, technical communication
Office in Ray B. West 313, (435) 797-3856

American Studies Graduate Adviser: Professor *Barre Toelken,* folklore, Native American studies, medieval literature
Office in Merrill Library 104B, (435) 797-2728

American Studies Undergraduate Adviser: *Jane Reilly,* Project Coordinator, American Studies
Office in Main 303, (435) 797-3632

Director, Writing Program: Associate Professor *Lynn L. Meeks,* teacher education, composition and rhetoric, literature for children and young adults
Office in Ray B. West 207, (435) 797-2723

Director, The Writing Center: *Andrea M. Peterson,* composition and rhetoric
Office in Ray B. West 104B, (435) 797-3853

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Professors *Jay Anderson*, folklife, material culture, folk art; *Jan Bakker*, nineteenth- and early twentieth-century American literature; *Melody Graulich*, American literature, American Studies, Western American literature, feminist studies; *Joyce A. Kinkead*, composition and rhetoric; *Willis L. Pitkin*, composition and rhetoric; **Associate Professors** *Kate M. Begnal*, twentieth-century literature, postmodernism, literary theory and criticism; *Patricia Gardner*, world literature, children's and young adult literature, folklore; *Keith A. Grant-Davie*, composition and rhetoric, reading theory, technical communication; *Sonia Manuel-Dupont*, linguistics, technical communication, teacher education; *Jan E. Roush*, American Studies, folklore; *Anne Shifrer*, twentieth-century literature, women writers, poetry, literary theory and criticism; *Ronald R. Shook*, technical communication, linguistics; *Steven Siporin*, folklore, folk narrative, material culture, folk ethnicity; **Assistant Professors** *Paul J. Crumbley*, American literature, women writers, poetry; *Kathryn R. Fitzgerald*, teacher education, composition and rhetoric; *Evelyn I. Funda*, American literature, Western American literature; *Bishnupriya Ghosh*, British and Commonwealth literature; *David E. Hailey, Jr.*, technical communication, online information, CBT technology; *Phebe Jensen*, sixteenth- and seventeenth-century British literature, Shakespeare; *Brian W. McCuskey*, nineteenth-century British literature; *John E. McLaughlin*, linguistics, technical communication, Native American languages; *Kristine A. Miller*, twentieth-century British literature; *Roberta S. Stearman*, American literature, fiction writing; *Mark Zachry*, technical communication; **Senior Lecturer** *Nancy O'Rourke*, technical communication; **Lecturers** *Jay A. Butler*, dramatic literature, composition, British literature; *Helen B. Cannon*, creative nonfiction, British and Commonwealth literature; *Marina L. Hall*, American literature, composition

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in English; BS, BA, MS, and MA in American Studies

Undergraduate emphases: *BS, BA in English*–Literary Studies, Professional/Technical Writing, and English Teaching; **Graduate specializations:** *MS, MA in English*–Literary Studies, Technical Writing, Theory and Practice of Writing; *MS, MA in American Studies*–Folklore, Public Sector Folklore, and Standard Program

Undergraduate Programs

General Objectives

The programs in English encourage students to gain an appreciation of language and literature through reading, analysis, and writing as practical tools of communication, as means of enriching their personal values and beliefs, and as a pathway toward rewarding careers. Through a variety of courses in literature, writing, and linguistics, students are given an opportunity to develop a heightened sensitivity to human experience, an awareness of these subjects in their personal and cultural contexts, and a capacity to adapt to a world of continually changing values and centers of conflict. Students majoring in English thus acquire communicative, analytical, and interpretive skills that help prepare them for a wide range of careers.

After completing a set of core requirements, students in English fulfill the requirements in one of three options: (1) the **Literary Studies** option, which gives students a broad grasp of the texts and writers of American, British, and world literature and their cultural contexts; (2) the **Professional/Technical Writing** option, which prepares students for various writing careers in business, industry, and government; and (3) the **English Teaching** option, which prepares students for teaching secondary-level English in the public school system.

In addition, the English Department also offers, under the auspices of The Mountain West Center for Regional Studies, an interdisciplinary American Studies program focusing on all relevant areas of American culture. The Department also offers a standard English minor and minors in American Studies, British and Commonwealth Studies, and English Teaching.

The English Department also offers specific courses supporting other fields of specialization, courses fulfilling University Studies (General Education) requirements, and enriching educational experiences through opportunities for creativity and expression enhancing lifetime activities.

Admission and Graduation Requirements

The requirements for admission and graduation are commensurate with those described on pages 43-50 of this catalog. To remain in good standing and to obtain approval for graduation as English majors or minors, students must maintain a minimum grade point average of 2.75 in their major and minor courses. All courses listed as major or minor subject courses must be taken on an *A-B-C-D-F* basis, and major or minor subject courses passed with less than a *C* grade must be repeated. Transfer students are required to complete at least 15 semester credits of major subject courses and 10 semester credits of minor subject courses in residence at USU.

Students in the English Teaching major and minor must also apply to the Professional Education Program. See pages 347-349 for procedures and requirements pertaining to teacher certification and admission requirements. See also the current edition of *USU Secondary Teacher Education Program Undergraduate Planning Guide*, available at the USU Bookstore.

Some major courses may be waived by Advanced Placement and CLEP credit, by evidence of equivalent courses, and, where appropriate, by department examinations.

Course Requirements

Core and Survey Requirements. All English majors are required to complete the following courses as soon as possible before enrolling in upper-division courses: Engl 1110 (an orientation course); Engl 2100 (a literary theory course); and Engl 2110, 2120, and 2130 (surveys of American, British, and world literature). Exceptions are noted below under option requirements.

Literary Studies Option. The fundamental premise of this 46-credit option is that literature, as an object of study, is not a fixed set of great works to be mastered, but a fluid set of symbolic practices to be investigated, a field of diverse representations that gives shape and meaning to human experience.

Students first complete the 2000-level survey courses, Engl 2110, 2120, and 2130, that provide a traditional overview of the major periods, authors, and genres of American, British, and

world literature. At the same time, students take an introductory course on literary theory, Engl 2100, which, in addition to introducing them to the methodologies of literary criticism, challenges received notions about the canon and literary history.

At the 3000 and 4000 levels, students closely examine the conventions and principles forming the more traditional survey courses (9 credits from Engl 3300, 3310, and 3320; 6 credits from Engl 4300, 4310, 4320, and 4330; 3 credits from Engl 4340, 4350, 4360, and 4370). Focusing on specific literary periods, authors, and genres, these courses invite students to think critically about how literature is constructed and organized as a field of knowledge. They also take a linguistics course (Engl 4200 or 4210), in which they study the structure and history of the English language.

At the 5000 level, students pursue advanced study of literature in relation to issues of gender and sexuality, regional and national boundaries, and cultural differences (9 credits from Engl 5300, 5310, 5320, 5330, and 5340). These courses insist that literary texts both exist within and depend upon a complex network of other cultural representations.

The final course, a senior capstone seminar (Engl 5350), encourages graduating students to both synthesize and critique their differing educational experiences within the program.

Professional/Technical Writing Option. This 55-58 credit option prepares students for career opportunities in various writing-related professions in business, industry, and government. The option consists of: (1) a theoretical foundation in rhetoric and linguistics, enabling students to assess any writing situation and adapt their writing to the context as audience-aware writers; and (2) writing practice in a variety of contexts, using the most up-to-date tools of technology, teaching students both how to write and why they are writing, thus preparing them for the ever-changing job markets of the twenty-first century.

Students begin their studies by completing 9 credits of literature survey courses (Engl 2110, 2120, and 2130), followed by two introductory professional writing courses (Engl 3400 and 3410) introducing students to the profession of writing and the current software and hardware used in all levels of text production. At the same time, students also take two courses (Engl 3450 and 3460) addressing rhetorical issues and strategies in the perception, reading, and writing of texts, and two courses in linguistics (chosen from Engl 4200, 4210, and 5210) acquainting students with the structure and diversity of the English language.

Students then take courses in document design and graphics (Engl 4410), interactive media (Engl 5410), and publication production and management (Engl 5420). Along with these, students may also take courses dealing with creative writing (Engl 3420, 3430, and 3440), as well as with more specific forms of writing, such as proposals, newsletters, and brochures (Engl 5400). Students complete the program by taking a capstone course (Engl 5430), in which they prepare portfolios, explore career opportunities, and prepare to enter the workforce.

English Teaching Option. This 46-49 credit option, leading to professional certification in the teaching of secondary-level English, prepares prospective English teachers to participate actively in the many communities related to the profession. Students become well-versed in their academic subject matter (language, writing, and literature), skilled in the methods of teaching the various components of the English curricula and in classroom management techniques, and committed to the achievement of students regardless of gender, race, or ethnic, religious, or socioeconomic background.

Students first complete 9 credits of literature survey courses and 3 credits of literary theory (Engl 2100, 2110, 2120, and 2130) to acquire a broad understanding of the traditional literary canon and the current theoretical foundations of English studies. They then take Engl 3520, 4200, and 4220, which address the current understandings of the diversity of American language and culture as it impacts the English classroom. Students then take courses in young adult literature (Engl 3510), Shakespeare (Engl 4300), and 12 more credits of upper-division literature and writing courses to become familiar with the spectrum of theoretical, ideological, and scholarly issues at stake in English studies today. To become familiar with the art of teaching the many components of the English curriculum, students then take two pedagogical courses (Engl 4500 and 4510), which approach reading and writing as interdependent aspects of communication. Finally, students fulfill the requirements of the 34-credit professional education courses prescribed by the Department of Secondary Education.

American Studies Major. The American Studies major is an interdisciplinary program providing students with the opportunity to integrate studies in various fields into a broad understanding of American culture and its antecedents. Because of its interdisciplinary nature, students have maximum freedom to pursue academic interests focusing on American culture by permitting them to choose areas of concentration and relevant courses from a variety of participating departments. The program's administration resides in The Mountain West Center for Regional Studies (Main 303) and is supervised by The American Studies Committee, comprised of representatives from participating departments.

For admission and graduation, students must have and maintain a minimum grade point average of 2.75. All courses used to fulfill the major and minor requirements must be taken on an *A-B-C-D-F* basis, and major or minor subject courses passed with less that a *C* grade must be repeated. Transfer students are required to take at least 15 credits of major subject courses and 10 credits of minor subject courses in residence at USU.

Students in American Studies have the option of pursuing either a Composite major of 51 credits, which provides a greater depth and breadth of understanding of American culture, or a Standard major of 33 credits, which also requires students to fulfill the requirements of an approved minor. Students in both majors are required to take two 3-credit fundamentals courses (chosen from Engl 2110, Hist 2700 or 2710, PolS 1100, USU 1300, and USU 1310), a 3-credit supportive elective course (see American Studies adviser for details, Main 303), a 3-credit advanced seminar during their junior year (Engl 4620), and a 3-credit course involving a senior project (Engl 4690).

In addition, all American Studies majors and minors plan courses of study drawing on six interdisciplinary course clusters: (1) American Institutions and Ideas, (2) American Art and Literature, (3) American Culture and Diversity, (4) American Folklore, (5) Nature and the Environment, and (6) Studies in the American West. Students in the 51-credit Composite major must complete a minimum of 36 credits from among these clusters. Students in the 33-credit Standard major must take a minimum of 18 credits from the clusters. Students in both majors may substitute a 3-credit internship for one of the cluster courses.

American Studies Minor. American Studies minor students

must meet and maintain a minimum 2.75 GPA admissions and graduation standard and complete the following 18-credit requirement. Students are required to complete one fundamentals course (Engl 2110, Hist 2700 or 2710, PolS 1100, USU 1300, or USU 1340), one supportive course, the junior-level advanced seminar (Engl 4620), and 9 credits in courses drawn from the six thematic clusters described above under the American Studies major. The courses of study must be approved by the American Studies adviser (Main 303) at least one year in advance of graduation.

English Teaching Minor. English Teaching minor students must meet and maintain a 2.75 GPA admissions and graduation standard and complete the following 24-credit requirement: Engl 1120, 2110, 2120, 3510, 3520, 4200, 4220, 4500, 4510. Any deviation from this plan must have the approval of the English Department's Director of Undergraduate Studies (Ray B. West 313).

English Standard Minor. The standard nonteaching minor consists of 18 credits of various courses, 12 of which must be in upper-division coursework. Nine of the 18 credits must be earned in residence at USU. Advanced Placement and CLEP credit and credit from Engl 1010 and 2010 may **not** be counted toward this minor. The program must be approved by the Director of Undergraduate Studies at least one year prior to graduation.

British and Commonwealth Studies Minor. The 18-credit minor in British and Commonwealth Studies is an interdisciplinary program sponsored by the departments of English and History. Students must complete Engl/Hist 2040, then select four appropriate courses from an approved list, and conclude with Engl 5920 or Hist 4930, in which they complete an individual project concerning Britain and/or the Commonwealth. The program selected must be approved by the chair of the British and Commonwealth Studies Program at least one year prior to graduation. **Note:** Courses used to fulfill requirements for the English or History majors may ***not*** be used for this minor. For further information, see the chair of the British and Commonwealth Studies Program (Library 224).

Additional Information and Updates

English programs are constantly being updated. Students should therefore confer with the Director of Undergraduate Studies (Ray B. West 313) and the American Studies adviser (Main 303) for information about changes in requirements, scheduling, and sequencing of courses. Current requirement sheets are also available from the English Department (Ray B. West 201 and 313) and in the Science/HASS Advising Center (Student Center 304). Degree program information is also available at the department's web site.

Financial Support and Scholarships

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the English Department employs a few students as tutors in The Writing Center and oversees various cooperative education and internship opportunities for students. Departmental scholarships are available on a competitive basis to juniors and seniors, as well as to some sophomores. Applications are accepted in January and February and are available in the college dean's office, Main 338. Financial aid information is also available at the department's web site.

Graduate Programs

Admission Requirements

In addition to the requirements specified on pages 60-61 (Admission Procedures), applicants for admission to the English Department graduate programs should have a BS or BA degree with an undergraduate major in a subject area relevant to the graduate program they desire to enter. The English Department accepts the Miller Analogies Test in place of the GRE general test, but encourages applicants to take the GRE. The department also requires a 5-10 page writing sample appropriate to the program the applicant desires to enter.

International applicants from non-English-speaking countries who desire an MS or MA degree in English should have a BS or BA degree in English from an accredited, English-speaking university. Students whose command of written English is not adequate to the demands of writing a graduate thesis in English may be required to take courses in Intensive English or may be counseled to obtain a second bachelor's degree at USU (30 credits minimum).

The annual application deadline is February 15 for those who wish to be considered for a graduate instructor position, a Moyle Q. Rice Scholarship, or other form of financial aid. The final annual deadline is May 1 for all other applicants who wish to begin their course of study the following semester. Late applications will be considered on a space-available basis only.

Anyone who has not been accepted into a graduate program in the English Department must have permission from the department's director of graduate studies to enroll in English graduate courses.

Degree Programs

The Department of English offers courses of study leading to the MS and MA degrees in English and in American Studies. Applicants seeking the English degree may be admitted into the Literary Studies program, the Theory and Practice of Writing program, or the Technical Writing program. Applicants seeking the interdisciplinary American Studies degree may draw from almost any combination of courses dealing with American culture: literature, history, art, government, etc. Folklore is one of the major subject areas in American Studies, with courses in all aspects of folklore study, including public sector folklore.

For a more complete description of the Department of English graduate programs, see the *English Department Graduate Studies Handbook*, available in the department's main office, Ray B. West 201.

English Program Requirements

Those applicants admitted to the English degree will complete 30 credits in one of three programs: Literary Studies, Theory and Practice of Writing, or Technical Writing.

Literary Studies. The purpose of the graduate Literary Studies master's degree program is to introduce students to the professional practice of literary and cultural criticism. Approximately one-half of the incoming students in Literary Studies enter directly upon finishing their undergraduate degrees. The rest come to the graduate program with varied work backgrounds. For all students, however, the emphasis in the program is on *professionalism*. Most students pursue teaching as a profession, including those who anticipate completing doctoral work in English and expect to teach in higher education, those who are already employed as teachers in secondary education or community colleges, and those who, after completing an undergraduate degree, are preparing for entry into teaching in secondary education or community colleges.

Literary Studies emphasizes three major components of professional practice: pedagogy, criticism, and research. All entering graduate students take two required courses, Teaching Literature (Engl 6310) and Critical Theory (Engl 6320), as early in their careers as possible. It is also expected, though not required, that many students in the program will be employed as graduate instructors, and will consequently take Practicum in Teaching English (Engl 6820). In Teaching Literature (Engl 6310) students examine pedagogical theory and engage in practical exercises involving the application of that theory to teaching situations, thus preparing both future doctoral students and future secondary educators to teach the introductory literature courses that lie immediately ahead in their careers. In Critical Theory (Engl 6320) students analyze the key methodological debates within literary and cultural studies and—most importantly—position themselves within those debates.

The majority of the program's credit hours are devoted to Seminar in Literary and Cultural Studies (Engl 6330). This is a repeatable course with topics changing each semester according to student need and faculty interest. There is no limit to the topics that can be offered. Students can expect to take five to seven seminars, choosing from topics that might include, for example, Fitzgerald and Hemingway, Victorian Popular Culture, Postmodern American Literature, Women's Western Fiction, British Fiction of the Blitz, Poems and Letters of Emily Dickinson, Chaucer, Postcolonial Literature and Theory, Political Shakespeare, Women Writers of the Commonwealth, and Regionalism in British Literature. The purpose of these varied courses is to immerse students within specialized fields of inquiry and to emphasize the production of professional-quality research and writing. Ultimately, the experience of the research seminars becomes the basis for the student's own independent research and writing, and the program's course of study culminates in the writing of a thesis (either Plan A or Plan B), under the guidance of a faculty mentor, on a topic selected by the student.

In addition to completing coursework and an independent project, students must also complete the Master of Arts degree by fulfilling the foreign language requirements as specified by the School of Graduate Studies (see page 65 of this catalog). Students interested in interdisciplinary work may take up to 6 credits in another area or department in lieu of the corresponding credits for Engl 6330.

Students employed in the department as graduate instructors must complete Practicum in Teaching English (Engl 6820) in lieu of 3 credits of Engl 6330.

The Literary Studies option is intended to be completed in two years (four semesters). By the time they complete it, graduate students will have redefined themselves as scholar-teachers—with their own individual voices, methods, and expertise—on the verge of professional careers in academics and education.

Theory and Practice of Writing. Theory and Practice of Writing offers students a chance to study writing theory in addition to encouraging the actual practice of writing. Most of the students in this program are pursuing careers involving the teaching of writing. After graduation, they may teach in two-year colleges or they may pursue doctoral study in a field such as Composition and Rhetoric. Alternatively, they may already be teaching at the secondary level. Courses will introduce students to the field of Composition Studies and train them in rhetorical theory, research methods, and creative and technical writing, primarily from the teaching perspective.

Students in Theory and Practice of Writing must take Introduction to Composition Studies (Engl 6810) during their first semester. They should also take Advanced English Theory and Methods (Engl 6850) or, if they are employed as graduate instructors, Practicum in Teaching English (Engl 6820). Students may pursue either the MS or the MA degree; however, the department recommends the MA for those students planning to continue study at the doctoral level. Students may also choose between Plan A and Plan B. Plan A consists of 24 credits of coursework and 6 credits of thesis; Plan B consists of 27 credits of coursework and 3 credits of thesis.

Technical Writing. Technical Writing is designed for students who already have some training and/or experience as practitioners of technical writing. The program's mission is to prepare students to enter or reenter nonacademic workplaces, not just as practitioners, but also as developers and managers of technical documents. When they finish the program, students will be qualified to determine and defend writing policy and practices in their workplaces.

To prepare students for these leadership roles, the program provides them with a strong theoretical understanding of their profession. In their graduate seminars, students will read widely in research and theory relating to workplace writing practices. They will critically examine both the theories and the practices, and they will explore ways in which each can enhance the other. They will also learn how to manage teams of writers, and they will explore ethical issues in the profession. The program will balance the theoretical training with opportunities for students to improve their own practical skills as technical writers, learning how to apply theory and current technology to the production of a variety of technical documents. This practical training will include multimedia presentations and graphic design.

The program is designed primarily for nontraditional students—working professional writers who want to enhance their credentials and build a strong theoretical understanding of their profession. However, it may also accept some traditional students who have just finished their undergraduate studies.

Students in Technical Writing must complete 30 credits under the Plan B option. Although Technology and the Writer (Engl 6410) is a core course requirement, it is not a prerequisite to any other course. Courses may be taken in any sequence. Students in this program generally pursue the MS degree. They must complete a portfolio (3 credits of Engl 6490) and an internship (3 credits of Engl 6900).

Note that the Technical Writing program is also available by on-line delivery for off-campus students.

American Studies Program Requirements

Those applicants who have been admitted to the American Studies degree will work out a program of study with either the American Studies adviser or the Folklore adviser. Generally, students develop their programs with an emphasis in American literature, folklore, or history. Interdisciplinary connections with many other departments at USU are possible. Students may choose to emphasize either the Standard program or the Folklore program, which includes a public folklore track. The American Studies degree requires 30 credits, with a preference for the MA and the Plan A (thesis) options, although the MS and the Plan B options are also accepted.

Students in the standard program must take American Studies Theory and Method (Engl 6600) during their first semester. Students in the Folklore program must take Folklore Theory and Method (Engl 6700) during their first semester. Students selecting the public folklore track will follow the same requirements as students in the Folklore program, with the following exception. All students in the public folklore track are required to take Folklore Fieldwork (Engl 6720), Public Folklore (Engl 6730), and Graduate Internship (Engl 6900).

Of special interest to students in American Studies are the *Western Historical Quarterly* and the *Western American Literature* journals published at USU, which often provide editorial and clerical positions for graduate students. Also, The Mountain West Center for Regional Studies sponsors lectures and programs and provides research assistance for students working in the field of regional studies. The Merrill Library is a regional depository for federal publications and receives 60,000 to 70,000 government titles each year. The library's Special Collections contain thousands of historical photographs, an immense store of pioneer diaries and papers, and a strong collection of books and manuscripts relating to the west, the pioneers, the Mormons, cowboys, and cowboy poetry. The Fife Folklore Archives, named after Utah folklorists Austin and Alta Fife and recognized as one of the best folklore archives in the country, contains over 3,400 books on folklore and folklore-related topics. The Special Collections also serve as the national repository for the American Folklore Society's Papers, over 50 linear feet of records and documents accumulated during the 104-year history of the organization.

General Requirements

All candidates for the MS and MA degrees must meet the School of Graduate Studies requirements (see pages 61-67 of this catalog). Only grades of *B-* or better will be accepted for credits in support of the degree programs; however, students must maintain an overall GPA of 3.0 to remain in the program.

All candidates must complete a comprehensive examination covering the material of their graduate program; however, the nature of this examination varies according to the particular program and the advice of the candidate's supervisory committee.

All candidates are required to successfully defend their Plan A thesis or Plan B paper. After successfully defending their Plan A thesis, students must submit a department-approved final draft to the thesis coordinator in the Graduate School office (Main 164). After successfully defending their Plan B paper, students must submit a department-approved copy to University Library Special Collections (Merrill Library 143).

All candidates who are first-year graduate instructors are required to take Practicum in Teaching English (Engl 6820) during their first semester. The candidate's supervisory committee will determine whether English 6820 will be accepted as part of the candidate's graduate program.

Financial Assistance

The Department of English has a limited number of graduate instructor positions and Moyle Q. Rice Scholarships available on a competitive basis for both English and American Studies graduate students. Those interested in applying for such financial assistance should contact the director of graduate studies in the English Department. The application deadline for financial assistance is February 15.

English Courses (Engl)

0010. Writing Tutorial. Provides additional instruction for students whose score on the ACT is 16 or less, or who are advised into the course on the basis of writing diagnosis given the first day of class in Engl 1010. Hours arranged. (3F,Sp,Su)

CL 1010. Introduction to Writing: Academic Prose. Students learn skills and strategies for becoming successful academic readers, writers, and speakers; such as how to read and write critically, generate and develop ideas, work through multiple drafts, collaborate with peers, present ideas orally, and use computers as writing tools. (3F,Sp,Su)

BHU 1030. Understanding Literature. Introduction to fiction, drama, and poetry of different periods and cultures. (3F,Sp,Su)

1110. English Orientation. Introduction to English as a profession. Reviews career opportunities for English majors. (1F,Sp)

1120. Elements of Grammar. Introduction to the study of the English sentence. Discussion of punctuation and usage to facilitate editing, as well as clarity and precision in writing. (3F,Sp) ©

1600. American Cultures in Film. Introduction to major ethnic groups in America and their treatment in recent feature films. Also taught as Hist 1600. (3F,Sp)

BHU 1710. Introduction to Folklore. Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). Also taught as Anth 1710 and Hist 1710. (3F,Sp)

CL 2010. Intermediate Writing: Research Writing in a Persuasive Mode. Writing of reasoned academic argument supported with appropriately documented sources. Focuses on library and Internet research, evaluating and citing sources, oral presentations based on research, and collaboration. Prerequisites: Completion of 30 credits, and one of: Engl 1010 or AP score of 3 or ACT score of 29. (3F,Sp,Su)

BHU 2030. Introduction to Shakespeare. Introduction to comedies, histories, tragedies, and nondramatic poetry for nonmajors. (3F)

BHU 2040. British and Commonwealth Cultures. Introduction to the diverse cultures of the British Isles and the Commonwealth of the present day. Particular emphasis on regional identity in relation to multiculturalism and internationalization. Also taught as Hist 2040. (3Sp)

2100. Introduction to Literary Theory. Introduction to fundamental questions and arguments within the field of literary criticism. Explores a variety of major theoretical approaches to literary texts. (3F,Sp)

2110. American Literary History. Introduction to major periods of American literary history. Explores basic problems of canon formation. (3F,Sp,Su)

2120. British Literary History. Introduction to major periods of British literary history. Explores basic problems of canon formation. (3F,Sp,Su) ©

2130. World Literary History. Introduction to major periods of world literary history. Explores basic problems of canon formation. (3F,Sp,Su)

***2720. Survey of American Folklore.** Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. Also taught as Anth 2720 and Hist 2720. (3Sp)

DHA 3020. Perspectives in Linguistics. In-depth study of linguistics for nonmajors. Topics vary according to faculty expertise. (3Sp)

DHA 3030. Perspectives in Literature. In-depth study of literature for nonmajors. Topics vary according to faculty expertise. (3F)

DHA 3040. Perspectives in Writing and Rhetoric. In-depth study of rhetoric and writing for nonmajors. Topics vary according to faculty expertise. (3Sp)

DHA 3070. Perspectives in Folklore. In-depth study of folklore for nonmajors. Topics vary according to faculty expertise. Also taught as Hist 3070. (3F)

3300. Period Studies in American Literature. Exploration of single period or movement in literary history of the United States, or a comparative study of a topic during various periods. Periods and topics will vary. (3F,Sp) ®

3310. Period Studies in British Literature. Exploration of single period or movement in British literary history, or a comparative study of a topic during various periods. Periods and topics will vary. (3F,Sp) ® ©

3320. Period Studies in World Literature. Exploration of single period or movement in literary history outside the United States and Great Britain, or a comparative study of a topic during various periods. Periods and topics will vary. (3F,Sp) ®

CI 3400. Professional Writing. Introduces students to workplace writing as a profession, emphasizing transition from writing for academic audiences to writing for readers of workplace documents. Students learn to design and write professional documents for science, industry, business, and/or government. Enrollment limited to English majors only. (3F,Sp)

3410. Professional Writing Technology. Examines technologies of professional writing. Students examine digital environments (computers, LANs, WANs, and the Internet), as well as the software studied while progressing through the Professional/Technical Writing Option curriculum. (3F,Sp)

3420. Fiction Writing. Covers basic elements of writing fiction: form, structure, plot, theme, characterization, dialogue, point of view, and imagery. (3F)

3430. Poetry Writing. Covers basic elements of writing poetry: language, detail, voice, tone, literal and figurative imagery, rhythm, open and closed form, structure, and theme. (3Sp)

3440. Creative Nonfiction Writing. Focuses on the essay as creative nonfiction, emphasizing persona, audience, purpose, tone, and style. Students study difference between fiction and nonfiction. Goal is to write publishable nonfiction. (3F,Sp)

3450. Reading Theory for Writers. Provides thorough understanding of reading from the perspective of writers. Students learn how readers process written texts, how reading assists writing, how readability is measured, and how online texts affect reading. (3F,Sp)

3460. Modern Rhetorical Theory. Teaches students to analyze rhetoric (the art of using language to influence other people) as it operates in a variety of texts. Students learn to define and understand rhetorical situations and to evaluate rhetorical strategies chosen by other writers. (3F,Sp)

3510. Young Adult Literature. Study of literature written specifically for adolescent audience, including realistic, fantasy, adventure, and historical fiction. Intended for those interested in teaching secondary school English. (3F,Sp)

3520. Multicultural American Literature. Introduction to study of ethnically diverse literatures of the United States, including Native American, Asian American, Hispanic/Latino, and African American. (3F,Sp)

***3530. Children's Literature.** Study of aesthetic merit of poetry and prose available for children, ages 1-12. Intended for those interested in teaching or writing for children. (3Sp) ©

***3620. Native American Studies.** Multidisciplinary introduction to study of Native Americans, emphasizing folklore, history, anthropology, literature, traditions, and contemporary issues such as the environment. (3F)

***CI 3700. Regional Folklore.** Study of folklore and folklife as a regionalizing process, rather than memorization of cultural contexts of a particular region. Regions examined through their folk culture include Brittany in Northwest France, the pine Barrens of New Jersey, and the Mormon cultural region of the Intermountain West. Also taught as Hist 3700. (3F)

CI 3710. Folklore Colloquium. Issues, problems, and methodologies in folklore study. Focus and instructor variable. Also taught as Hist 3710. (3Sp) ®

4200. Linguistic Structures. Introduction to liguistic science: phonetics, phonology, morphology, and syntax, especially as relating to English. Exposure to other aspects of linguistic analysis, including language origins and linguistic diversity. (3F,Sp,Su)

4210. History of the English Language. Introduction to linguistic history of English, beginning with its Indo-European roots and continuing through Old English and Middle English to Modern English. Covers sociolinguistic aspects of English use, as well as strict grammatical history. (3Sp)

4220. Ethnic Literacy. Examines emergence of literary skills in American ethnic groups. Topics include SES, child-rearing practices, first and second language acquisition, nonstandard dialect, etc. (3F,Sp)

4230. Language and Society. Covers sciences of sociolinguistics and anthropological linguistics. Indroduces concepts dealing with relationship of language to society and culture, and interaction of language with society and culture. (3F)

4250. Playwriting. Study of dramatic theory and sample plays, combined with practice in writing short plays. Students must write a minimum of three plays. Also taught as Thea 4250. (3F)

4300. Shakespeare. Selected works of William Shakespeare, with attention to biographical and cultural contexts. (3F,Sp) ®

4310. American Writers. Selected works of either a single author or a closely related group of authors based in the United States, with attention to biographical and cultural contexts. (3F) ®

4320. British Writers. Selected works of either a single author or a closely related group of authors based in Great Britain, with attention to biographical and cultural contexts. (3Sp) ®

4330. World Writers. Selected works of either a single author or a closely related group of authors based outside the United States, with attention to biographical and cultural contexts. (3F) ®

****4340. Studies in Prose Fiction.** Analysis of the genre of prose fiction, emphasizing nature and evolution of specific forms. (3Sp) ®

***4350. Studies in Poetry.** Analysis of the genre of poetry, emphasizing nature and evolution of specific forms. (3F) ®

4360. Studies in Drama/Film. Analysis of dramatic and cinematic genres, emphasizing nature and evolution of specific forms. (3Sp) ®

****4370. Studies in Nonfiction Prose.** Analysis of the genre of nonfiction prose, emphasizing nature and evolution of specific forms. (3F) ®

4400. Professional Editing. Editing of technical and scientific documents, working with deadlines, different levels of editing, editing marks, working with groups of editors and clients, and total document design, including graphics. Prerequisites: Engl 3400 and 3410. (3F,Sp)

4410. Document Design and Graphics. Explores elements of page layout, graphic design, type fonts, and design of documents to suit client's needs. Prerequisites: Engl 3400 and 3410. (3F,Sp)

4420. Advanced Fiction Writing. Offers advanced study in art and skill of writing publishable fiction. Relies on workshop method. Prerequisite: Engl 3420 or equivalent. (3Sp)

4430. Advanced Poetry Writing. Provides capstone course for undergraduate students desiring to write publishable poetry. Relies on workshop method. Prerequisite: Engl 3430 or equivalent. (3F)

CI 4500. Teaching Writing. Prepares students to teach writing at secondary level. Teaches appropriate pedagogical techniques for teaching writing for a variety of purposes and contexts to diverse students. Techniques taught include designing effective writing assignments, responding constructively to student writing, assessing student writing, and incorporating technology into writing courses. (3F,Sp)

CI 4510. Teaching Literature. Prepares students to teach literature, including print literature, film, television, and print journalism. Explores variety of pedagogical strategies for teaching diverse literary traditions to students of various backgrounds and developmental levels. (3F,Sp)

****4610. Western American Literature.** Examines major themes and important writers (both “popular” and “literary”) in western regional writing. Investigation of significance of environment, history, gender, and ethnicity in a variety of genres. Appropriate for American Studies majors and minors. (3F)

4620. Advanced Seminar in American Studies. Builds upon foundation courses in American Studies and introduces students to theory and methods. Prepares students for the senior project. Required for American Studies majors and minors. Should be taken after completion of 12 credits in the major, but prior to completion of 21 credits. Also taught as Hist 4620. (3Sp)

***4630. American Nature Writers.** Interdisciplinary study of historical, social, literary, and environmental contexts of nature writing. Examines key authors, major theories, enduring concerns (e.g., conservation, preservation, and management), and current issues (including gender and ethnicity). Appropriate for American Studies majors and minors. (3F)

****CI 4640. Studies in the American West.** Interdisciplinary course in American Studies, exploring the region of the West through the analysis of literary texts, historical sources, and socio-cultural materials. (3F)

CI 4690. American Studies Capstone Seminar. Required for students majoring in American Studies. Supports design and writing of senior thesis. Each student selects a topic integrating insights from classes taken by the individual student for the American Studies major. Also taught as Hist 4690. (3)

****4700. Folk Material Culture.** Introduction to folklife studies, emphasizing patterns of expressive culture (material, verbal, and customary) in selected folk groups. In-depth examination of vernacular primary sources, including documentary and feature films. Also taught as Hist 4700. (3Sp)

4750. Advanced Folklore Workshop: Fife Conference. Focuses on one theme or topic in folklore, and offers lectures from nationally prominent scholars in the area. Taught during one week, every day and all day. To receive grade, student must write critical paper. Also taught as Hist 4750. (3Su) ®

4900. Internship/Cooperative Work Experience. Offers credit for professional experience obtained outside the classroom, prior to graduation. Requires statement of professional goals and summary report following the experience. Prerequisite: Departmental approval. (1-15F,Sp,Su) ®

4910. Tutoring Practicum. Introduction to tutoring, and seminar for tutors working in the Writing Center. Repeatable for up to 2 credits. (1F,Sp) ®

5210. Topics in Linguistics. Provides students with opportunity to study topics which are not regularly taught, but which are designed to enrich understanding of linguistics. Typical topics include Old English, roots of English in Germanic, discourse analysis, and English as a world language. (3F) ®

5300. Literature and Gender. Exploration of cultural relations between literature and gender. Topics vary. (3Sp) ®

5310 Literature and Region. Exploration of cultural relations between literature and geographic regions. Topics vary. (3F) ®

5320. Literature and Cultural Difference. Exploration of relations between literature and cultural difference. Topics vary. (3Sp) ®

CI 5330. Cultural Studies. Applications in cultural studies, taught using an interdisciplinary approach focusing on relationship between literary texts and other forms of cultural production. Topics vary. (3F) ®

CI 5340. Studies in Literary Theory. Advanced study of specific methodology or central problems within field of literary theory. Topics vary. (3Sp) ®

CI 5350. Literary Studies Capstone. Communicative intensive capstone course in which students synthesize and assess their knowledge of the discipline. (3F,Sp)

5400. Specialized Documents. Professional/technical writing majors prepare documents frequently encountered in business and government, including proposals, environmental impact statements, brochures, and newsletters. Prerequsites: Engl 3400 and 3410. (3F,Sp) ®

5410. Interactive Media. Professional/Technical Writing majors examine process of publishing online documents, studying multimedia, hypermedia, and hypertext environments. Students build complex CD-ROM environments, and also study help file authoring and Web page design. Prerequisites: Engl 3400 and 3410. (3F,Sp) ®

5420. Publications Production. Professional/Technical Writing majors examine process of publishing printed documents, beginning with idea and ending with hard copy, printed and bound. Prerequisites: Engl 3400 and 3410. (3F,Sp)

CI 5430. Professional Writing Capstone. Capstone course for students in Professional/Technical Writing option, in which students develop a professional portfolio of their own writing. (3Sp)

5490. Studies in Writing and Rhetoric. Provides students and faculty with opportunities for in-depth study of timely topics. Topics vary. (3) ®

5700. Folk Narrative. Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. Also taught as Anth 5700 and Hist 5700. (3Sp)

5900. Senior Honors Seminar. Capstone course for students enrolled in English Honors Program. Prerequisite: Enrollment in English Honors Program. (1-3F,Sp) ®

CI 5910. Senior Honors Thesis. Students work in conjunction with English faculty member to write a thesis. Prerequisite: Enrollment in English Honors Program. (1-6F,Sp,Su) ®

5920. Directed Study. Provides students with opportunity to work individually with faculty member. Contract for work to be completed must be signed by faculty member and student, then filed with English Department. (1-3F,Sp,Su) ®

6310. Teaching Literature. Introduction to theory and practice of teaching literature. Students read and discuss theoretical materials, as well as practice different classroom techniques. (3sp)

6320. Critical Theory. Study of major theoretical methods and arguments in literary and cultural studies, emphasizing both the history of the discipline and the application of theory to specific texts. (3F)

6330. Seminar in Literary and Cultural Studies. Seminars devoted to specific topics in literary and cultural studies, emphasizing the presentation and publication of critical writing. (3F,Sp,Su) ®

***6400. Advanced Editing.** Examines complex roles editors assume in creating technical and nontechnical documents. Principal components include working with substance of documents, mediating the writer-reader relationship, and exemplifying the application of rhetorical theory in editing. (3F)

****6410. Technology and the Writer.** Study of theoretical aspects of technology affecting writing. Examines history of computing, manner in which computing is changing rhetoric, and theories presented by academic community. (3F)

****6420. Multimedia Documents.** Students examine production of advanced multimedia documents. In this process, they examine the scholarship and theories underlying the media, plus hardware and software necessary to produce tutorials and similar technical documents in CD-ROM-like environment. (3Sp) ®

****6430. Traditional Publications Management.** Covers processes of managing traditional publications, including information development cycle, supervision, and budgets. Students work with an organization to produce a document from its inception to the product, guided by theories of scholars and practitioners. (3Sp)

***6440. Electronic Publications Management.** Focuses on examining and publishing technical documents online. Introduces students to CD-ROM, online tutorials, and Web-based technical information systems. Students also individually research scholarships and theories presented by scholars in the field. (3Sp) ®

****6450. Reading Theory and Document Design.** Examines how reading theory interacts with rhetoric of graphics, layout, and type to influence the way documents are designed for maximum information and readability. (3F)

****6460. Online Writing.** Focuses on rhetorical skills demanded by tutorial, help file, and Web site authoring, using hypertext. Students practice writing and research theory, along with approaches to rhetoric in these new media. (3F) ®

***6470. Informative Documents.** Writing of documents which inform, but don't have sales as major purpose. Includes documents such as technical reports, manuals, and environmental impact statements. (3Sp) ®

***6480. Marketing Documents.** Design and preparation of documents such as proposals and sales brochures that are persuasive in nature. (3F) ®

6490. Portfolio. Design and preparation of a portfolio containing at least five documents, each accompanied by a justification and discussion. Includes a defense. (3F,Sp,Su)

***6600. American Studies Theory and Method.** Provides students with theory and method of graduate-level research in American Studies. Also taught as Hist 6600. (3F)

***6610. Seminar on the American West.** Readings and research on topics in the American West. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as Hist 6610. (4F)

****6620. Seminar in Native American Studies.** Readings and research on topics in Native American history and culture. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as Hist 6620. (4F)

***6630. Studies in Film and Popular Culture.** Offered annually on a rotating basis by professors in folklore and English (Cultural Studies, Literature, British and Commonwealth). Topics and theoretical approaches vary, but the primary focus is on feature films. Also taught as Hist 6630. (3Sp) ®

6700. Folklore Theory and Method. Serves as orientation for new graduate students in folkore. Introduces students to comparative annotation, folklore indices, oral-formulaic theory, performance theory, contextual analysis, and other approaches. Also taught as Hist 6700. (3F)

****6710. Regional Folklore.** Study of folklore and folklife as a regionalizing process, rather than memorization of cultural contexts of a particular region. Regions examined through their folk culture range. Also taught as Hist 6710. (3Sp)

6720. Folklore Fieldwork. Basic methodology class for folklorists and oral historians. Students learn interviewing techniques and other methods for observing and recording the performance of tradition and traditional history. Also taught as Hist 6720. (3Sp)

****6730. Public Folklore.** Provides history and analysis of governmental involvement in protecting, promoting, and otherwise manipulating and utilizing cultural heritage. Also taught as Hist 6730. (3Sp)

****6740. Folk Narrative.** Covers principal narrative genres in folk tradition (myth, tale, legend, ballad) and the basic theories for their analysis and discussion. Also taught as Hist 6740. (3Sp)

6750. Advanced Folklore Workshop (the Fife Conference). Intensive workshop focusing on a topic in folklore. Brings in nationally known experts as lecturers and discussants. Students attend all sessions, then write a critical paper during the summer semester. Also taught as Hist 6750. (3Su)

***6760. Cultural and Historical Museums.** Examines outdoor cultural and historical museums, examining their function in modern multi-cultural societies. Also taught as Hist 6760. (3Sp)

6770. Seminar in Folklore and Folklife. Conducts close, professional-level study of major areas of folklore and folklife research. Also taught as Hist 6770. (3F)

****6810. Introduction to Composition Studies.** Introduces students to graduate work in the field of composition studies. Students learn topics, issues, scholars, scholarly practices, and scholarly forums of the field; and also explore a focused research topic in the field. (3F)

6820. Practicum in Teaching English. Introduction to teaching writing, designed specifically for graduate instructors teaching in the English Department writing program. Focuses on theory and practice of teaching writing, specifically Engl 1010, but also prepares graduate instructors for further teaching responsibilities. (3F)

****6830. Rhetorical Theory.** Covers intellectual traditions of rhetoric from classical times to the present. As students study major theories, theoreticians, and controversies in the field, they come to understand rhetoric as the study of relations between discourse, knowledge, and power. (3Sp)

***6840. Research Methods in Composition.** Survey of research methods used in the study of composition, emphasizing qualitative and quantitative approaches to understanding teaching, learning, and the writing classroom. Prerequisite: Engl 6410. (3Sp)

****6850. Advanced English Theory and Methods.** Focuses on theory and practice of teaching English. Explores various philosophical positions in the field and examines their practical implications. Covers theories and methods relevant to both process and product of teaching English in an integrated language arts curriculum. (3Sp)

6860. Teaching Technical Writing. Prepares students to teach general-purpose technical writing courses at secondary or undergraduate level. Students read and discuss articles on technical writing and practice writing a series of technical documents. (3Sp)

***6870. Teaching Creative Writing.** Prepares students to teach creative writing at a variety of levels, including secondary, junior college, community college, and four-year university. Enrollment limited to graduate students only. (3F)

****6880. Topics in Creative Writing.** Course changes topics as follows: poetry, fiction, and nonfiction. In each topic, students learn to write at an advanced level and learn to evaluate creative writing using workshop and peer group methods. Enrollment limited to graduate students only. (3F) ®

6890. Studies in Writing and Rhetoric. Provides students and faculty with opportunity for in-depth study of timely topics. (3) ®

6900. Graduate Internship. Designed primarily for students in technical writing. Students research theory and practice relating to a focused topic and to the environment where they are employed. Internships vary in format for students in the department's other programs. (1-15F,Sp,Su) ®

6920. Directed Study. (1-6F,Sp,Su) ®

6970. Thesis. (1-6F,Sp,Su) ®

6990. Continuing Graduate Registration. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Family and Human Development

College of Family Life

Head: Professor *Brent C. Miller*, marriage and family relationships, adolescent pregnancy, adoption, research methods
Office in Family Life 211, (435) 797-1501

Child Development Laboratory Director: Associate Professor *Shelley L. Knudsen Lindauer*, alternative child care, gender role development, early childhood education, curriculum administration, socialization, development in infancy and early childhood

Gerontology Certificate Program Coordinator: Assistant Professor *Silvia Sörensen*, preparation for caregiving with aging family members, aging in cultural contexts

Graduate Program Coordinator: Associate Professor *Randall M. Jones*, adolescent development, identity, problem behavior, prevention, research methods

Marriage and Family Therapy Program Director: Associate Professor *Thorana S. Nelson*, marriage and family therapy, gender, family therapy training and supervision

FAX (435) 797-3845
E-mail fhdmail@flcl.usu.edu
WWW http://www.usu.edu/~famlife/fhd

Professors *Ann M. Berghout Austin*, alternative child care and family life, development from birth to 12 years of age; *Glen O. Jenson*, rural family, in-law and grandparent role performance, family life education, work/family challenges, family issue identification; *Thomas R. Lee*, parenting, family life education, family resiliency; *Jay D. Schvaneveldt*, marriage and family studies, family life education, international families, theory and methods; **Adjunct Professors** *Frank R. Ascione*, prosocial development, moral development, developmental psychopathology; *Deborah A. Byrnes*, multi-age classrooms, teachers' attitudes towards students with English as a second language, social studies education; *Sarah Rule*, methods of early intervention, applications of technology to staff development, improvement of service delivery systems; **Professor Emeritus** *C. Jay Skidmore*, family therapy, family life education; **Associate Professors** *Scot M. Allgood*, family therapy process, assessment, and marital studies; *D. Kim Openshaw*, marriage and family therapy, research and application, typological and intervention strategy advancement of youthful sexual offending, theoretical conceptualization of self-esteem, martial arts and mental health related syndromes; *Lori A. Roggman*, infant social development, attachment, parenting stress, play across the life span, physical attractiveness, early intervention; **Assistant Professors** *Kathleen W. Piercy*, midlife, older adults and family caregiving, family policy, qualitative methodology; **Adjunct Assistant Professor** *T. Brent Price*, marriage and family therapy; **Lecturers** *Deborah B. Ascione*, marriage, human development, child abuse and neglect; *Susan L. Ericksen*, undergraduate practicum coordinator, undergraduate adviser, marriage and family therapy, professional development; *Farol Ann G. Nelson*, early childhood education, child development, parent education, experiences in the arts for early childhood; **Adjunct Clinical Lecturer** *Victor H. Nelson*, marriage and family therapy, gender issues

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Family and Human Development; BS and BA in Early Childhood Education; specialization in Family and Human Development in the Family Life Doctor of Philosophy (PhD)

Undergraduate emphases: *BS, BA in Family and Human Development*–Family and Community Services, Human Development; *BS, BA in Early Childhood Education*–certification, K-3rd grades; **Graduate specializations:** *MS*–Adolescence and Youth, Adult Development and Aging, Infancy and Childhood, Marriage and Family Relationships, Marriage and Family Therapy

Gerontology Certificate Program: The Gerontology Certificate Program at Utah State University is administered through the Department of Family and Human Development, and is open to all majors. Students preparing for careers in the field of aging complete selected aging-related coursework, including a supervised field practicum in a gerontological setting. For a list of requirements for this interdisciplinary certificate, contact the department. A minimum GPA of 2.67 is required for the Gerontology Certificate.

Undergraduate Programs

Objectives

The Department of Family and Human Development offers a program designed to prepare students for careers as family and human development specialists in agencies serving children and other family members throughout the life span. Majors study a curriculum which ranges from infancy through old age, and from marital formation to marital dissolution through death or divorce. These classes help students develop the knowledge and skills necessary to deal professionally with current issues and problems confronting families and children in the nation and the world.

Student majors in the department are required to complete at least one practicum experience, which is arranged with the practicum coordinator locally or in other geographical areas. Types of practicum sites include state agencies, hospitals, preschools and day care centers, nursing homes, retirement homes, parenting programs, drug and alcohol programs, detention centers, and crisis intervention centers. Practicum experience in the human development emphasis is completed in the Adele and Dale Young Child Development Lab setting. Students majoring in Early Childhood Education complete a formal internship in the Adele and Dale Young Child Development Labs and in primary grades as part of this focus.

Majors in Family and Human Development, as well as in Early Childhood Education, receive the necessary preparation for graduate study in a family-human development related field or employment. Some majors acquire a teaching certificate so they can also teach in the public schools.

In addition to preparation for advanced study or job opportunities, FHD majors receive increased knowledge and skills in topics which will enhance their personal and family lives. Preparation for marriage, parenthood, and family relationships is a central concern in the department.

All majors in the department are accredited by the American Association of Family and Consumer Sciences. Certification in Early Childhood Education is also available.

Requirements

Departmental Admission Requirements. Students with less that 24 semester credits can declare a premajor in FHD (code PFHD). Completion of at least 24 semester credits (including FHD 1500 and 2400) with a cumulative GPA of 2.75 is required for admission into the major (code FHD). Students who have met these requirements should bring a copy of their transcript and the Change of Major form to FL 214 to obtain a signature from the undergraduate adviser.

College of Family Life Requirement. FHD majors, like other majors in the College of Family Life, must complete the college orientation course, FL 1100 (2 cr., spring semester).

Departmental Program Requirements. The department has several regulations governing students' academic progress:

1. The *P/D+*, *D*, and *F* option cannot be used for courses required in the FHD major or minor.
2. A required course can only be repeated *once* to improve a grade.
3. An overall cumulative GPA of 2.75 is required to enter the major, and a 2.5 GPA is required for graduation. A GPA of 2.75 in FHD major courses is also required for graduation.
4. All major requirements, as described below, must be completed.

All majors in the department (except ECE majors) complete a common departmental core of 24 semester credits, and then choose an emphasis in Family/Community Services or Human Development, as shown below.

FHD Core Courses: FHD 1500, 2400, 2610, 3110, 3120, 3130; Psy 2800 or Soc 3120; and FHD 4900.

Family/Community Services Emphasis: FHD 3210, 4220, 4230, 4240, and 4980[2], plus two courses from the Human Development emphasis (including one with a lab).

Human Development Emphasis: FHD 3510, 3520, 3530, 3540, 4550, 4960[1], and 4980[2], plus two courses from the Family/Community Services emphasis.

FHD Minor. The minor in FHD is designed to offer a knowledge base for understanding families and human development, to enhance the training of majors in other academic disciplines. A minor in FHD requires 15 semester credits of FHD coursework, including FHD 1500 and 2400. The remaining credits can be selected from any other undergraduate courses, except FHD 2250 or 3130, practica (FHD 4900, 4960, 4970, 4980), and Readings and Conference (FHD 4990). The *P/D+*, *D*, *F* option cannot be used for courses taken for the minor. Minor requirement advising sheets are available in FL 214.

Early Childhood Education Major Requirements. Majors in early childhood education are certified to teach in preschool, kindergarten, and grades 1-3. Several practica and field experiences with children are provided, and a subject matter minor is selected (e.g. science, language arts, etc.). This major is a cooperative effort between the Department of Family and Human Development and the Department of Elementary Education. Students are required to complete a student teaching practicum in a preschool program, a kindergarten, and in the public schools grades 1, 2, or 3. Additional materials describing the ECE major in the Department of Family and Human Development are available from the ECE advisers in FL 214.

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[1]To get on a waiting list, students must apply for FHD 4960 at least three semesters in advance of taking the class. Apply in Family Life Building, room 214.

[2]Students must apply for FHD 4970 and 4980 practicum applictions at least one full semester in advance of taking these classes. Apply in Family Life Building, room 214.

Additional Information

For more detailed information about the Family and Human Development and Early Childhood Education majors, see advisement guides available in the administrative office of the department (FL 211). These guides also provide details about minors, recommended electives, and the gerontology certificate. Students should also check with the department for current requirement sheets, which are updated each year. These guidelines and requirements should also be available on the department's home page at http://www.usu.edu/~famlife/fhd.

Financial Support

In addition to the scholarships, assistantships, grants-in-aid, and work-study programs available through the University, the College of Family Life and the Department of Family and Human Development also give several tuition waivers, scholarships, and other types of support each year. Students should inquire at the Dean's Office in Family Life 205, the departmental office in Family Life 211, or the Financial Aid Office in Student Center 106.

Graduate Programs

Admission Requirements

See general admission requirements on pages 60-61. Students may use either the GRE or MAT for application for all specializations in the MS degree, but the GRE is required for the PhD program. Additional assessment is required for admission to the MS marriage and family therapy emphasis. An applicant's MAT score, or the GRE verbal and quantitative scores, should be at or above the 40th percentile.

Degree Programs

Graduate students receive a strong research and theoretical base in family relationships and human development. In addition to the core courses required for each of the specializations, students have the opportunity to achieve their program goals with a wide range of other graduate courses in the department, as well as designated courses in related programs at USU. Graduate students are also expected to engage in independent study, practica, and other specialized professional experiences that help them to acquire specific skills.

The department provides advanced graduate education and training for students to (1) establish the professional competency necessary for employment in research, teaching, marriage and family therapy, extension, and administration; (2) develop skills necessary for agency administration in the field of family and child care services; (3) receive clinical practice in marriage and family therapy; and (4) develop the skills for supervisory responsibilities in child development laboratories, child-care facilities, and adolescent programs.

MS in Family and Human Development. Students in the MS program complete a research thesis that makes a contribution to knowledge in family studies or human development.

All students in the MS Marriage and Family Therapy specialization also complete required clinical experiences. The MS Marriage and Family Therapy specialization satisfies basic educational requirements for Utah State licensure in marriage and family therapy and clinical membership in AAMFT. The Marriage and Family Therapy specialization is accredited by the Commission on Accreditation for Marriage and Family Therapy Education.

PhD Specialization in Family and Human Development. Students in the PhD specialization complete a major research dissertation that makes a significant contribution to the theoretical and empirical knowledge in family studies or human development.

Specializations

The department offers the Master of Science degree (MS) in Family and Human Development. The college offers the doctorate degree (PhD) with a specialization in Family and Human Development. The MS degree has specializations in Adolescence and Youth, Adult Development and Aging, Infancy and Childhood, Marriage and Family Relationships, and Marriage and Family Therapy. With the exception of Marriage and Family Therapy, these are also available as emphases in the Family and Human Development PhD specialization. Further information may be obtained from the department and by accessing the department's home page at http://www.usu.edu/~famlife/fhd.

Course Requirements

The core substantive courses for the master's degree are FHD 6030, 6060, and 6070. Master's students also complete course requirements under their chosen specialization in Family Relations, Marriage and Family Therapy, or Human Development. Elective courses and thesis topics are individualized with each student by faculty supervisory committees.

Doctoral core courses are FHD 7060 and 7070. Doctoral students also complete topical seminars, methods and statistics courses, research and teaching internships, comprehensive exams, and dissertation research.

Research

The department has three major child development laboratories, an adolescent lab, other research labs, and marriage and family therapy facilities that are available for research and training in the graduate program. The department enjoys a long history of research activities with preschools, public schools, extension programs, and other agencies throughout the state, and is building a program of gerontology research.

Recent faculty and graduate student research projects have been funded by the state Office of Child Care and the Office of Juvenile Justice, and by the national Office of Head Start, the Office of Adolescent Pregnancy Programs, Child Trends Inc., and the Kellogg Foundation.

Financial Assistance

Extensive teaching, research, and extension graduate assistantships are available for applicants for both the MS and PhD degrees. Attractive fellowships are available for strong PhD students with high GPA and high GRE scores. When an applicant's folder is complete, it is reviewed by the Graduate

Admissions and Finance Committee, which makes specific recommendations regarding admission and financial support. Assistantships and fellowships typically include waivers for out-of-state tuition. Most students pay the regular in-state tuition. A limited number of tuition waivers is available for qualified students.

Career Opportunities

Recent recipients of advanced degrees have found employment in public schools, academic departments at various colleges and universities, research centers, hospitals, Head Start, child-care programs, social services, mental health agencies, private and clinical practice settings, extension services, and related agencies that teach about, study, or serve individuals and families.

Additional Information and Updates

The department publishes a *Graduate Handbook* providing more detail about graduate program admission and requirements. Graduate programs also are described more fully on the department's home page at http://www.usu.edu/~famlife/fhd.

Family and Human Development Courses (FHD)

BSS 1500. Human Development Across the Lifespan. Overview of human development across the lifespan, from conception to death. (3F,Sp) ©

2250. Seminar in Early Childhood Education. Orientation to current philosophies, teaching techniques, and curricula found in programs for young children. Practicum experience as a student aide in an early childhood education program. Prerequisite: Admission to teacher education or instructor's permission. (4F,Sp)

BSS 2400. Marriage and Family Relationships. Overview of couple and family relationships, including marriage, child bearing and rearing, intergenerational relationships, and alternative family forms. (3F,Sp) ©

2610. Parenting and Child Guidance. Review of parenting styles and child guidance philosophies with emphasis on principles and techniques. (3F,Sp) ©

3110. Human Sexuality. Development and expression of human sexual values, attitudes, and behaviors in family and cultural contexts. Prerequisites: FHD 1500, 2400. (3F)

3120. Abuse and Neglect. Causes, treatment, and laws regarding family violence, including child abuse and neglect, partner abuse, and elder abuse. Prerequisites: FHD 1500 or Psy 1100. (3F,Sp) ©

QI 3130. Research Methods. Common methodologies used in current family and human development research. Emphasis on becoming a knowledgeable and informed consumer of research. Enrollment limited to FHD majors. Prerequisite: Stat 1040. (3Sp)

3210. Families and Cultural Diversity. Similarities and differences in family patterns and functions in terms of race and ethnicity, gender, social class, and international development. Prerequisites: FHD 1500, 2400. (3Sp)

3510. Infancy and Early Childhood. Development and growth of the child from conception to five years. Physical, social, and emotional growth; and parenting skills. Lab is included. Prerequisites: Junior standing and FHD 1500, 2610. (4F)

3520. Children in the Middle Years. Growth and development of normal children. Guidance principles related to behavior of children at these age levels. Lab is included. Prerequisites: Junior standing and FHD 1500, 2610. (3F)

3530. Adolescence. Social, psychological, and physical aspects of adolescence in modern societies. Social and cultural expectations and influences on adolescents stemming from the family, peers, school, and the community. Prerequisites: Junior standing and FHD 1500. (3F)

3540. Adult Development and Aging. Interdisciplinary perspective on developmental issues in adulthood and old age. Biosocial, cognitive, and psychosocial changes in older adults in family, community, cultural, and socio-political contexts. Prerequisites: Junior standing and FHD 1500, or instructor's permission. (3F)

4220. Family Crises and Interventions. Normative and nonnormative stressors provoking individual and family crises. Principles and techniques for family interventions. Prerequisites: Junior standing and FHD 1500, 2400, 3120. (3Sp)

4230. Families and Social Policy. Local, state, and federal policies with implications for individuals and families across the lifespan. Prerequisites: Junior standing and FHD 1500, 2400. (3F)

4240. Social and Family Gerontology. Social, cultural, and family contexts of aging. Intergenerational family relations in later life. Social policies and services affecting older adults and their families. Prerequisites: Junior standing and FHD 1500, 2400, 3540. (3Sp)

4550. Preschool Methods and Curriculum. Use of materials, equipment, and activities in planning and implementing curricula for preschool children. Prerequisites: Junior standing and FHD 1500. (2F,Sp)

4900. Pre-Practicum Skills. Acquisition and integration of interpersonal skills, conflict resolution, and ethical decision-making for active participation in FHD practica. Enrollment limited to FHD majors. Prerequisites: Junior standing, FHD 1500, 2400, 2610, 3120. (3F,Sp)

4960. Practice Teaching in Child Development Laboratories. Intensive teaching practicum in the Child Development Lab program. Arrangements need to be made at least one year in advance. Prerequisites: Junior standing and FHD 1500, 2610, 4550. (3 or 6 F,Sp,Su)

4970. Gerontology Practicum. Placement experience in gerontology settings. Practical opportunities to apply theory, knowledge, and skills. Prerequisites: Senior standing and FHD 3540, 4240. Apply one semester in advance. (1-6F,Sp,Su) ®

4980. Practicum. Placement experience in applying skills and knowledge in community agencies. Enrollment limited to FHD majors. Prerequisites: Junior standing and FHD 4900, for a total of 30 FHD credits. (1-12F,Sp,Su) ®

4990. Readings and Conference. Directed independent study of topics preselected by faculty and student. Instructor permission required before registration. (1-6F,Sp,Su) ®

5550. Interdisciplinary Workshop. (1-3F,Sp,Su) ®

5830. Seminar Working with Peers on Multidisciplinary Teams. Seminar for discussion of topics pertaining to how teams work with children, with and without disabilities, in a practicum. Students assigned to a team for planning and problem solving throughout the semester. (1Sp)

6010. Survey of Family Relations Research. Overview and critique of substantive areas of research in marriage and the family. Prerequisite: FHD 2400 or equivalent. (3F)

6020. Survey of Human Development Research. Examines contemporary research and developmental issues. Highlights social development from social-historical and social change framework. Prerequisite: FHD 1500 or equivalent. (3Sp)

6030. Research Methods. Overview of methods for studying family relations and human development, including sampling, measurement, research design, and data analyses/interpretations. Research proposal required. Prerequisite: FHD 3130 or equivalent. (3Sp)

6060. Human Development Theories. Overview of major developmental theories, including contributions from philosophical, personality, and learning thoeries. Explores epistemology, ethology, and systems theories relating to human development. Prerequisite: FHD 1500 or equivalent. (3F)

6070. Family Theories. Critical review and assessment of theories in family research, along with construction and application of family theory. Prerequisite: FHD 2400 or equivalent. (3F)

6210. Seminar in Family Diversity. Review and assessment of international families, gender, race, social class, and structural diversity. Prerequisite: FHD 2400 or equivalent. (3Sp) ®

6220. Seminar in Family Crises and Interventions. Selected current issues for understanding and working with family stress and crisis. Prerequisite: FHD 2400 or equivalent. (3Sp) ®

6230. Seminar in Family and Social Policy. Selected current issues in development, implementation, and evaluation of local, state, and federal policies with major implications for families. Prerequisite: FHD 2400 or equivalent. (3F) ®

6240. Seminar in Parent/Child Relationships. Selected issues in parent-child relationships across the lifespan. Prerequisites: FHD 1500, 2610, or equivalent. (3Sp) ®

6310. Survey of Marriage and Family Theory. Overview of marriage and family therapy models. Historical development of marriage and family therapy as a profession and a practice. (3F)

6320. Foundations of Marriage and Family Therapy. Epistemological and philosophical directions of marriage and family therapy, beginning with early applications of General Systems theories and cybernetics through constructivist and postmodern frameworks. (3F)

6330. Marriage and Family Therapy Practice I: Traditional Approaches. Traditional approaches to marriage and family therapy. Focuses on individual and couple issues, including sexuality and personality issues within a systems framework. Prerequisite: Undergraduate course in human sexuality or equivalent. (3Sp)

6340. Marriage and Family Therapy Practice II: Contemporary Approaches. Contemporary approaches to marriage and family therapy. Focuses on couple and family interaction issues, including conflict, parenting, and other common family problems. (3Sp)

6350. Clinical Practice in Marriage and Family Therapy. Selected clinical issues in marriage and family therapy. (3Sp) ®

6360. Ethical and Professional Development in Marriage and Family Therapy. Ethical, legal, and professional issues in marriage and family therapy. (3F)

6370. Assessment in Marriage and Family Therapy. Development, application, and interpretation of major individual and family assessment techniques used in marriage and family therapy practice and research. (3Sp)

6380. Topical Seminar in Marriage and Family Therapy. Selected issues in marriage and family therapy. (1-3F,Sp,Su) ®

6390. Practicum in Marriage and Family Therapy. Supervised clinical experience in marriage and family therapy. Prerequisites: Admission to Marriage and Family Therapy emphasis and instructor's permission. (1-6F,Sp,Su) ®

6510. Topical Seminar in Infancy. Selected topics related to development in the first three years of life. Prerequisite: FHD 1500 or equivalent. (3Sp) ®

6520. Topical Seminar in Childhood. Selected topics related to development in early and middle childhood. Prerequisite: FHD 1500 or equivalent. (3F,Sp) ®

6530. Topical Seminar in Adolescence. Selected topics related to development in the second decade of life. Prerequisite: FHD 1500 or equivalent. (3F) ®

6540. Topical Seminar in Adult Development and Aging. Selected topics related to development in adulthood and old age. Prerequisite: FHD 1500 or equivalent. (3Sp) ®

6910. Topical Seminar in Family and Human Development. Selected emergent issues in family and human development. (3F,Sp) ®

6960. Thesis Research. Research for master's thesis, arranged with adviser. Prerequisite: Adviser's permission. (1-6F,Sp,Su) ®

6970. Continuing Graduate Advisement. Continuing registration to complete thesis requirements. Prerequisite: Six credits of FHD 6960. (1-3F,Sp,Su) ®

6980. Graduate Practicum. Application of family and human development skills and knowledge in a supervised setting, as arranged by adviser. Prerequisite: Adviser's permission. (1-9F,Sp,Su) ®

6990. Readings and Conference. Directed independent study of topics preselected by faculty and student. Prerequisite: Instructor's permission. (1-6F,Sp,Su) ®

7060. Advanced Research and Theory in Human Development. Critical review of research and theories in human development. Prerequisite: FHD 6060 or equivalent. (3F)

7070. Advanced Research and Theory in Family Relations. Critical review of research and theories in marriage and family relationships. Prerequisite: FHD 6070 or equivalent. (3Sp)

7910. Topical Seminar in Family and Human Development. Selected emergent issues for advanced professionals in family and human development. (3F,Sp) ®

7960. Dissertation Research. Research for dissertation, as arranged with adviser. Prerequisite: Adviser's permission. (1-9F,Sp,Su) ®

7970. Continuing Graduate Advisement. Continuing registration to complete dissertation requirements. Prerequisite: Twenty credits of FHD 7960. (1-3F,Sp,Su) ®

7980. Advanced Graduate Practicum. Professional supervision of doctoral students, applying general principles from the study of research in family and human development. Prerequisite: Adviser's permission. (1-9F,Sp,Su) ®

7990. Readings and Conference. Directed independent study of topics preselected by faculty and student. Prerequisite: Instructor's permission. (1-6F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of

Fisheries and Wildlife

College of Natural Resources

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Professors *Gary E. Belovsky,* conservation biology, population ecology; *John A. Bissonette,* leader, Utah Cooperative Fisheries and Wildlife Research Unit, ungulate biology, behavioral ecology; *Michael R. Conover,* animal behavior, wildlife damage management; *Charles P. Hawkins,* aquatic ecology, stream and riparian ecosystems; *John A. Kadlec,* associate dean, College of Natural Resources, wetlands ecology, wildlife management; *Frederic H. Wagner,* wildlife ecology, natural resources policy; *Michael L. Wolfe,* wildlife ecology and management; *Wayne A. Wurtsbaugh,* aquatic ecology, limnology, fish ecology; **Professor Emeriti** *John M. Neuhold,* fisheries management, aquatic ecology; **Associate Professors** *Todd A. Crowl,* aquatic ecology, conservation biology, river ecology; *Thomas C. Edwards, Jr.,* Utah Cooperative Fisheries and Wildlife Research Unit, avian ecology, conservation ecology, biometrics, spatial ecology; *Chris Luecke,* aquatic ecology, fisheries management; *Terry A. Messmer,* fisheries and wildlife extension specialist, wetlands ecology, waterfowl, wild ungulate, private land management, conservation communication; *Mark E. Ritchie,* population and community ecology, landscape ecology, conservation biology; *Robert H. Schmidt,* wildlife policy, wildlife damage management; **Associate Professor Emeriti** *Gar W. Workman,* fish and wildlife ecology and fish culture; **Assistant Professors** *David A. Beauchamp,* Utah Cooperative Fisheries and Wildlife Research Unit, aquatic predator, food web ecology; *Barrie K. Gilbert,* wildlife ethology, behavioral ecology; *C. Anna Toline,* conservation genetics, fisheries biology; **Research Professors** *Frederick F. Knowlton,* Predator Ecology and Behavior Unit, predator ecology and behavior; *J. Russell Mason,* leader, Predator Ecology and Behavior Unit, chemical ecology, animal behavior; **Research Associate Professor** *Jeffrey L. Kershner,* USDA Forest Service, national habitat coordinator, fisheries ecology and management; **Research Assistant Professor** *Eric M. Gese,* Predator Ecology and Behavior Unit, predator behavior and ecology; **Extension Assistant Professor** *Richard C. Etchberger,* Uintah Basin Branch Campus, wildlife-habitat relationships, natural resources education; **Adjunct Assistant Professor** *Ronald W. Goede,* director, State of Utah Division of Wildlife Resources Fisheries Experiment Station, fish diseases

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Fisheries and Wildlife; MS and PhD in Aquatic Ecology; MS and PhD in Fisheries and Wildlife Ecology

Undergraduate emphases: *BS in Fisheries and Wildlife*–Fisheries Management and Wildlife Management (other undergraduate options can be arranged to meet student needs); **Graduate specializations:** *MS, PhD in Fisheries and Wildlife*–Conservation Ecology, Fisheries Biology, Fisheries Management, Problem Wildlife Management, Wetlands Ecology, Wildlife Biology, Wildlife Management; *MS, PhD in Aquatic Ecology*–Mammalian and Avian Ecology, Population Ecology, Stream Ecology, Theoretical Ecology, and Wetlands Ecology; *MS, PhD in Fisheries and Wildlife Ecology*–Population Ecology

Undergraduate Programs

Objectives

The Department of Fisheries and Wildlife offers broad educational opportunities for students interested in the analysis and management of fish and wildlife populations, their habitats, and the related ecosystems. The department's philosophy of education is to promote a broad interdisciplinary approach to natural resource analysis and management.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Fisheries and Wildlife are the same as those described for the College of Natural Resources (see page 84).

Bachelor of Science in Fisheries and Wildlife. Students must meet the course requirements for University Studies in addition to the following departmental requirements. The first two years of study include courses designed to give the student a sound scientific background, an introduction to the field of natural resources management, and an introduction to fisheries and wildlife. Supporting math and science courses include: Math 1050, 1100; Biol 1210, 1220, 1230, 1240; Chem 1210, 1220, 1230, 1240; Phyx 2110; and Stat 3000. Natural resource management core courses include: NR 1130, 2220, 2340, and 3000. Introductory Fisheries and Wildlife core courses include: FW 3100, 3110, 3200, and 3210. University Studies and elective courses must also be included, resulting in a total of approximately 15 credits per semester.

During the junior and senior years, all students take upper-level departmental and college core courses. Additionally, students take departmental elective courses to fulfill their special interests, as well as any remaining University Studies courses. Fisheries and Wildlife upper-level core courses include: FW 3300, 3400, 4500, 4400 or 4510, 4950, and 5400. Natural resources management upper-level core courses include: NR 3600 and 4000. University Studies and elective courses must also be included, resulting in a total of approximately 15 credits per semester and 120 credits required for the major.

For information about changes in requirements, course sequence, and scheduling, students should confer with a departmental adviser. The undergraduate program can be readily tailored to individual student needs with the help of a faculty adviser.

Fisheries and Wildlife Minor. The minor is designed for students with a strong background in biology. The department head's approval and a minimum of 18 credits are required. Course requirements include: FW 3100, 3200; NR 2220, 3000; and two of the following courses: FW 3300, 3400, 4100, and 5400.

Graduate Programs

Admission Requirements

General admission requirements apply, in addition to the requirements which follow. Although admission to the Fisheries and Wildlife graduate program is treated on an application-by-application basis, the following are usually required: (1) an overall GPA of 3.2 or better on the most recent two years of academic work; (2) a combined verbal and quantitative GRE score of at least 1,100; and (3) a letter of "interest and purpose" detailing the applicant's reasons for seeking an advanced degree.

Previous training in fisheries or wildlife is not a prerequisite for admission, although a sound background in the biological sciences is recommended. Successful applicants without the necessary background in fisheries or wildlife sciences will be expected to obtain it in the course of their studies for the advanced degree.

Degree Programs

A Master of Science in Fisheries and Wildlife, with emphasis on the management of fish and wildlife resources directed toward decision-making roles in natural resource agencies, is offered for the applicant with previous agency experience and for the student motivated toward an administrative career.

A thesis or dissertation based on original research performed by the student is required. Written comprehensive examinations are required of all students pursuing the PhD degree. At the discretion of the student's graduate advisory committee, an additional oral examination may be required.

The minimum requirement for an MS degree is 30 credits, including at least 23 credits in residency and 6 credits of thesis research. The minimum requirement for a PhD degree is 60 approved graduate credits in addition to an MS degree, **or** 90 approved graduate credits with no MS degree. At least one year (a minimum of 32 credits), including a minimum of two consecutive semesters, of full-time registration must be in residence at USU.

With committee approval, graduate credit can be transferred from accredited graduate schools, provided the minimum residency requirement (including thesis and dissertation credit) at USU is met. Transfer credit, which must not have been used for any other degree, will be shown on official USU transcripts at completion of the degree.

Master of Natural Resources. The department also participates in the College of Natural Resources Master of Natural Resources (MNR) degree program. For more information, see page 309.

Specializations

The MS and PhD degrees in Fisheries and Wildlife, Aquatic Ecology, and Fisheries and Wildlife Ecology allow students to specialize, respectively, in Conservation Ecology, Fisheries Biology, Fisheries Management, Problem Wildlife Management, Wetlands Ecology, Wildlife Biology, and Wildlife Management; in Mammalian and Avian Ecology, Population Ecology, Stream Ecology, Theoretical Ecology, and Wetlands Ecology; and in Population Ecology.

Assistantships

Research assistantships are available through individual faculty members who hold research grants or contracts. Occasionally, teaching assistantships are available through the department. Recipients of teaching assistantships are usually selected from among PhD students.

Career Opportunities

Fisheries and Wildlife professionals occupy an expanding niche in the fields of natural resources and environmental management. Graduates in Fisheries and Wildlife often work as wildlife management biologists, fisheries management biologists, conservation officers, or fish hatchery biologists. Employees in entry-level positions frequently work directly with wildlife, fish, habitats, and the public. With experience and advanced education, Fisheries and Wildlife graduates may do management planning, systems analysis, and environmental or resource impact analyses.

Federal agencies, such as the Fish and Wildlife Service, Forest Service, Bureau of Land Management, Bureau of Reclamation, U.S. Army Corps of Engineers, Bureau of Indian Affairs, National Marine Fisheries Service, and National Park Service, hire students with degrees in Fisheries and Wildlife. Graduates also find employment with state conservation agencies, private environmental consulting firms, private game farms, hunting and fishing preserves, refuges, energy development firms, and others.

Additional fisheries and wildlife education also provides a good foundation for careers in fields such as environmental law, journalism, and secondary education.

Fisheries and Wildlife Courses (FW)

BLS 1200. Biodiversity: Its Conservation and Future. Today, species extinctions are occurring at an unprecedented rate. People in developed countries are concerned with this loss. Solving this problem requires knowledge of what determines biodiversity, how it is being threatened, and how its loss can be countered. (3Sp)

BLS 2200. Ecology of Our Changing World. Foundations of ecological and evolutionary relationships of organisms with other organisms and with the physical environment, emphasizing populations, communities, and ecosystems. Integration of basic science with applications of science to understanding human interactions with the environment. (3F,Sp) ©

2220. General Ecology. Study of the interrelationships among organisms, humans, and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. Prerequisites: Biol 1210, 1220. (3F,Sp)

2250. Introductory Internship/Co-op in Fisheries and Wildlife. Introductory-level educational experience in internship/cooperative education position approved by department. (1-3F,Sp,Su) ®

DSC 3000. Oceanography. Examines fundamental interrelationships between physical environment of the oceans and the life forms they support. Suitable for nonbiologists. (3Sp)

CI 3100. Fish Diversity. Systematics, physiology, ecology, and evolution of major groups of marine and freshwater fishes. Stresses functional morphology, physiological ecology, and community interactions explaining fish abundance and distribution. Prerequisites: Biol 1210, 1220. (3F)

3110. Fish Diversity Laboratory. Focuses on field collection, identification, and habitat relationships of freshwater fishes in North America. Prerequisite: FW 3100 (may be taken concurrently). (1F)

CI 3200. Wildlife Diversity. Natural history (identification, distribution, life history, physiology, and behavior) of North American vertebrates, especially game birds and mammals and threatened species. Emphasis on ecological, behavioral, and evolutionary aspects of special relevance to management. Prerequisites: Biol 1210, 1220. (3Sp)

3210. Wildlife Diversity Laboratory. Laboratory and field course in species identification; techniques of sex/age determination; and interpretation of morphological, physiological, and behavioral adaptations. Prerequisite: FW 3200 (may be taken concurrently). (1Sp)

3300. Management Aspects of Wildlife Behavior. Principles, concepts, and mechanisms of animal behavior, emphasizing behavioral ecology, development, and comparative aspects of special relevance to management of fish and wildlife. (3F)

3400. Fish and Wildlife Populations. Explores fundamentals of how and why animal populations change over time. Strong quantitative approach used to show how these fundamentals apply to fisheries and wildlife management. Prerequisites: NR/Biol/FW 2220, Math 1100. (3F)

3600. Living with Wildlife. Reviews history and development of wildlife management programs in the United States. Explores diversity of attitudes toward wildlife, which affect development and evolution of wildlife management programs. Development and analysis of case histories of contemporary and controversial wildlife management decisions. (3Sp)

4050. Urban Fish and Wildlife Management. Concentrates on: understanding impacts of urbanization on wildlife and habitat; developing basic understanding of wildlife needs; completing urban wildlife habitat inventory; and preparing urban wildlife conservation and management plan. (3F,Sp,Su) ©

4100. Fisheries and Wildlife Policy and Administration. Provides broad introduction to policy issues and administrative approaches in fish and wildlife management, with particular emphasis on nonbiological issues facing wildlife managers and administrators. (3F)

4200. Wildlife Law Enforcement. Review of principles of state and federal statute regulations pertaining to fish and wildlife. Discussion of rights of the individual, apprehension of violators, and collection of evidence and its use in court. (2F)

4250. Advanced Internship/Co-op in Fisheries and Wildlife. Advanced-level educational experience in internship/cooperative education position approved by department. (1-15F,Sp,Su) ®

4400. Terrestrial Ecology Laboratory. Field and laboratory analysis of terrestrial populations, communities, and ecosystems, with emphasis on hypothesis testing and decision-making. Prerequisite: NR/Biol/FW 2220 (may be taken concurrently). (2F)

4500. Freshwater Ecology. Ecosystem analysis of physical, chemical, and biological interactions in lakes and streams. Application of these concepts for managing aquatic system. Prerequisites: Chem 1210, 1220; Phyx 1200. (3F)

4510. Aquatic Ecology Laboratory. Integration of limnological theory and methods of conducting field and laboratory analyses of physical, chemical, and biological parameters in writing. Field trips required. Prerequisite: FW/WS 4500 (may be taken concurrently). (2F)

4810. Directed Reading in Wildlife Damage Management. Focuses on wildlife damage management, especially as it reflects on both positive and negative human-wildlife interactions. For this reading course, students work with instructor to develop appropriate and rigorous reading program. (2F,Sp,Su) ©

4900. Fisheries and Wildlife Special Topics. Individual study and research upon selected fisheries and wildlife problem. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4910. Directed Reading. Individual reading research on selected fisheries and wildlife topic. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4920. Undergraduate Research. Individual or team research. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4950. Undergraduate Seminar. Intended to bring upperclassmen up-to-date on topics in fisheries and wildlife. (1F,Sp) ®

***5000. Predator Ecology and Management.** Reviews biology, ecology, theory, management, and policy issues involving large vertebrate predators. Uses case histories to explore predation theory, population ecology, natural history, and management strategies. (3Sp)

5100. Wildlife Management Laboratory. Familiarizes students with variety of wildlife management and research techniques and strategies, including techniques to catch, mark, and restrain wild animals; monitoring wildlife populations; measuring physiological parameters; measuring habitat variables; assessing and preventing wildlife damage; and interpreting and analyzing biological data. (3F)

***5200. Fish Habitat Relationships in Managed Forests.** Examines biological and social factors influencing aquatic ecosystems and fish habitats within the context of forest management. Analyzes ecological relationships of fish habitats within forest ecosystem, and how these are influenced by forest management practices. Provides examples of forest habitat issues in major regions of North America, illustrating that both biological and social factors must be considered in developing management strategies and programs. (3F)

5300. Wildlife Damage Management Principles. Explains current legal, ethical, and biological principles for the control and/or management of problem vertebrate species. (3Sp)

5350. Wildlife Sociobiology. Examines wildlife communication, reproductive tactics, mating systems, parent-offspring conflicts, and social behavior. (3Sp)

5400. Community and Ecosystem Concepts in Fisheries and Wildlife Management. Reviews factors controlling number of species, and their absolute and relative abundances in different habitats. Analyzes how species influence ecosystem structure and function (e.g., productivity, nutrient cycling, etc.). (3Sp)

***5500. Water Quality and Pollution.** Reviews biological and social problems caused by water pollution and land use; toxicology, water quality parameters, and use criteria related to the Clean Water Act; and sampling techniques. Prerequisites: Chem 1210, 1220; FW 4500. (3Sp)

5550. Freshwater Invertebrates. Taxonomy, ecology, and biology of major freshwater intertebrate taxa, including insects, crustaceans, molluscs, and oligochaetes. Several weekend field trips and a collection required. Prerequisite: One year of general biology or zoology, or permission of instructor. (3Sp)

5600. Principles in Fishery Management. Emphasizes management of fish populations within context of community and ecosystem dynamics. Stresses use of simulation models to assess effects of growth, recruitment, and mortality on age-structured populations. (3Sp)

***5640. Riparian Ecology and Management.** Explores structure and function of riparian ecosystems and management options for maintaining sustainable ecological function. Prerequisites: WS 3700 and NR/Biol/FW 2220 or permission of instructor. (3Sp)

***5750. Advanced Conservation Biology.** Examines cases and consequences of population and species declines, including activities such as habitat fragmentation and introduction of exotic species, as well as natural causes due to genetics and demography. (3F)

5800. Genetics in Conservation and Management. Provides general background in conservation genetics. Lectures include some introductory population genetics and molecular techniques, theory, and evolution. After acquiring general understanding of these topics, students are exposed to molecular techniques during built-in hands-on laboratory experience. Recommended prerequisites: Evolution, population genetics, and/or genetics. (4Sp)

***6100. Aquatic Production and Fish Ecology.** Reviews current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Analyzes physiological, behavioral, population, and community concepts of fish interactions with their environment. Prerequisite: FW/WS 4500 or equivalent, or instructor's permission. (3Sp)

***6150. Concepts in Habitat Selection and Foraging Behavior.** Explores fundamental concepts of how animals choose resources within their environment. Employs various optimization models to derive principal hypotheses, design relevant experiments, and interpret field data. Explores real-world applications through extensive readings, commentaries, and problem sets. Prerequisite: NR/Biol/FW 2220 or equivalent. (3sp)

6180. Molecular Population Genetics Laboratory. Application of molecular techniques to population genetics, ecology, and systematics. Includes experimental and sampling design, and data analysis. Prerequisite: Biol 5170/6170 or permission of instructor. (5F)

6200. Advanced Fisheries and Wildlife Policy and Administration. Provides in-depth look at policy issues and administrative approaches in fish and wildlife management, with particular emphasis on nonbiological issues facing wildlife managers and administrators. (3F)

6250. Graduate Internship/Co-op in Fisheries and Wildlife. Graduate-level educational experience in internship/cooperative education position approved by department. (1-15F,Sp,Su) ®

6300. Topics in Physiological Ecology of Wildlife. Explores physiological ecology of wildlife, focusing on sensory factors influencing habitat selection, foraging, and mate choice. Prerequisites: Introductory coursework in biology, behavior, anatomy, and chemistry. Prerequisite: Permission of instructor. (3Sp)

***6350. Wildlife Damage Management Policy.** Review and analysis of state and national policies associated with wildlife damage management issues. While often extremely controversial, these issues have significant impacts on food and fiber production, public health and safety, and wildlife conservation. Includes investigation of policies and techniques, and outlining of decision-making processes. Emphasizes issue identification and human dimension factors. (3Sp)

6400. Ecology of Animal Populations. Growth, fluctuation, balance, and control of animal populations. Prerequisite: NR/Biol/FW 2220 or equivalent. (4Sp)

6500. Biometry: Design and Analysis of Ecology Research. Examines research design from statistical perspective, showing how data analysis is largely determined by research design and its implementation. Reviews statistical tools for analysis of ecological data in the context of design. Prerequisite: Graduate standing. (4F)

6510. Topics in Spatial Ecology. Seminars on analysis and interpretation of spatially explicit ecological data. Topics vary yearly, and range from spatial statistics to assessing uncertainty in environmental information systems to spatial analyses of plant and animal populations. Prerequisite: Graduate-level course in statistics. (1-3Sp) ®

6600. Assessment of Abundance and Related Parameters for Biological Populations. Students learn to estimate population abundance and associated error bounds using mark-recapture, area-swept, declining catch, line-transect, and other techniques. Emphasizes sampling design considerations to match objectives of an assessment to appropriate/feasible level of accuracy and precision. (3Sp)

6700. Landscape Ecology. Focuses on landscape-scale patterns and processes, and ways of understanding ecological complexity. Explores conceptual underpinnings of larger-scale ecology. Emphasizes understanding of current peer-reviewed literature. (4Sp)

6800. Stream Ecology. Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/Biol/FW 2220 and FW/WS 4500. (2F)

6810. Stream Ecology Laboratory. Presents advanced techniques for study of stream ecosystems. Emphasizes techniques for quantifying physical and biotic structure of streams. Each student designs and carries out independent field project. Prerequisites: NR/Biol/FW 2220, FW/WS 4500, 4510, and concurrent enrollment in FW/WS 6800. (2F)

***6850. Theoretical Population Ecology.** Using framework of mathematical modeling, reviews basic ecological processes (e.g., competition, predation, and environmental stresses) that determine numbers of individuals in plant and animal populations. (3F)

6870. Ecology Seminar. The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. (1F) ®

6900. Graduate Special Topics. Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (1-5F,Sp,Su) ®

6910. Directed Study. Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (1-5F,Sp,Su) ®

6950. Department of Fisheries and Wildlife Graduate Seminar. Exposes students to new developments in research and management in the field of fisheries and wildlife. Features participation by students, faculty, and guest lecturers. (1F,Sp) ®

6960. Graduate General Ecology. General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic enviroments. (5F)

6970. Thesis Research. Offers credit for field or laboratory research at master's level. (1-15F,Sp,Su) ®

6990. Continuing Graduate Advisement. Offers credit for students currently enrolled in a master's program, who are not currently taking classes. Students may be conducting research or waiting for final approval from School of Graduate Studies. (1-3F,Sp,Su) ®

***7100. Aquatic Production and Fish Ecology.** Reviews current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Analyzes physiological, behavioral, population, and community concepts of fish interactions with their environment. Prerequisite: FW/WS 4500 or equivalent, or instructor's permission. (3Sp)

***7150. Concepts in Habitat Selection and Foraging Behavior.** Explores fundamental concepts of how animals choose resources within their environment. Employs various optimization models to derive principal hypotheses, design relevant experiments, and interpret field data. Explores real-world applications through extensive readings, commentaries, and problem sets. Prerequisite: NR/Biol/FW 2220 or equivalent. (3Sp)

7300. Topics in Physiological Ecology of Wildlife. Explores physiological ecology

of wildlife, focusing on sensory factors influencing habitat selection, foraging, and mate choice. Prerequisites: Introductory coursework in biology, behavior, anatomy, and chemistry; and permission of instructor. (3Sp)

***7350. Wildlife Damage Management Policy.** Review and analysis of state and national policies associated with wildlife damage management issues. While often extremely controversial, these issues have significant impacts on food and fiber production, public health and safety, and wildlife conservation. Includes investigation of policies and techniques, and outlining of decision-making processes. Emphasizes issue identification and human dimension factors. (3Sp)

7400. Wildlife Damage Management Principles. Explains current legal, ethical, and biological principles for the control and/or management of problem vertebrate species. (3Sp)

7450. Wildlife Sociobiology. Examines wildlife communication, reproductive tactics, mating systems, parent-offspring conflicts, and social behavior. (3Sp)

***7640. Riparian Ecology and Management.** Explores structure and function of riparian ecosystems and management options for maintaining sustainable ecological function. Prerequisites: FR/RLR/WS 3700 and NR/Biol/FW 2220 or permission of instructor. (3Sp)

7700. Landscape Ecology. Focuses on landscape-scale patterns and processes, and ways of understanding ecological complexity. Explores conceptual underpinnings of larger-scale ecology. Emphasizes understanding of current peer-reviewed literature. (3Sp)

***7750. Advanced Conservation Biology.** Examines cases and consequences of population and species declines, including activities such as habitat fragmentation and introduction of exotic species, as well as natural causes due to genetics and demography. (3F)

7800. Stream Ecology. Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/Biol/FW 2220 and FW/WS 4500. (2F)

7810. Stream Ecology Laboratory. Presents advanced techniques for study of stream ecosystems. Emphasizes techniques for qualifying physical and biotic structure of streams. Each student designs and carries out independent field projects. Prerequisites: NR/Biol/FW 2220, FW/WS 4500, 4510, and concurrent enrollment in FW/WS 7800. (2F)

***7850. Theoretical Population Ecology.** Using framework of mathematical modeling, reviews basic ecological processes (e.g., competition, predation, and environmental stresses) that determine numbers of individuals in plant and animal populations. (3Sp)

7970. Dissertation Research. Offers credit for field or laboratory research at doctoral level. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. Offers credit for students currently enrolled in a doctoral program, who are not currently taking classes. Students may be conducting research or waiting for final approval from School of Graduate Studies. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*This course is taught alternating years. Check with department for information about when course will be taught.

Department of
Forest Resources

College of Natural Resources

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Office in Natural Resources 208, (435) 797-3219

Graduate Program Coordinator: Associate Professor: *David W. Roberts*, forest ecology, forest modeling, vegetation ecology

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Professors *James J. Kennedy*, policy and administration of natural resource and environmental management; *Richard S. Krannich*, natural resource policy and sociology; *James N. Long*, forest ecology, silviculture; *H. Charles Romesburg*, philosophy of natural resources and dynamical systems analysis; **Non-tenure-track Professor** *Jesse A. Logan*, forest insect ecology, disturbance ecology, dynamical systems analysis; **Adjunct Professor** *Norbert V. DeByle*, effects of management practices on northern Rocky Mountain forest ecosystems; **Professors Emeriti** *Theodore W. Daniel*, silviculture; *Ronald M. Lanner*, forest genetics, dendrology, tree growth, morphogenesis; **Associate Professors** *Frederick A. Baker, Jr.*, forest pathology, computer applications; *Dale J. Blahna*, natural resource sociology, policy, and outdoor recreation; *Mark W. Brunson*, social science aspects of forest and rangeland management; *Joanna L. Endter-Wada*, cultural anthropology and natural resource policy and sociology; *Michael J. Jenkins*, disturbance ecology and management, insects, fire, snow avalanches; *Michael R. Kuhns*, forestry extension, urban forestry, tree physiology; *Robert J. Lilieholm*, natural resource management and economics, land use planning, agroforestry; *Helga Van Miegroet*, forest soils and biogeochemical cycling; **Adjunct Associate Professors** *David C. Chojnacky*, forest research; *John L. Crane, Jr.*, environmental resource management; **Research Associate Professor** *Leila McReynolds Shultz*, plant taxonomy and geography; **Non-tenure-track Assistant Professor** *Barbara J. Bentz*, forest entomology; **Adjunct Assistant Professors** *Janet A. Anderson*, natural resource sociology, outdoor recreation and interpretation, USU Libraries; *Janet M. Eisenhauer*, rural sociology and economics; *Tamsin C. McCormick*, environmental education, geology; *Bruce M. Pendery*, forest policy; *Robert H. Schmidt*, wildlife damage management; *Nancy Huffman Shea*, environmental education; *Douglas G. Wachob*, environmental education, vertebrate ecology; **Adjunct Instructors** *Jon Keith Schnare*, timber harvest planning and logging methods; *Katherine S. Voth*, public affairs officer

Degrees offered: Bachelor of Science (BS), Master of Science (MS), Master of Forestry (MF), and Doctor of Philosophy (PhD) in Forestry; BS, MS, and PhD in Recreation Resource Management; MF in Forest Management; MS and PhD in Forest Ecology; BS in Environmental Studies (Interdisciplinary Natural Resources Program)

Graduate specializations: *Forestry (MF, MS, PhD)*—Forest Biology, Forest Economics and Policy

Undergraduate Programs

Objectives

The major instructional goal of the Department of Forest Resources is to provide an excellent professional program in forest ecosystem management, with quality graduate programs in specific disciplines. To that end, the department continually evaluates and upgrades courses and curricula in response to changes in professional and governmental standards, makes effective use of University resources for instructional development, seeks to maintain a student-to-faculty ratio allowing for personalized instruction and advisement, provides adequate field experience as an integral part of professional undergraduate education, encourages and assists students in finding seasonal professional employment, seeks to integrate international students into the program through supplementary advising and tutoring, encourages students to become active in professional organizations, and seeks to attract and retain the highest quality undergraduate and graduate students. Other departmental goals are to generate new knowledge and to develop applications of current knowledge that will promote understanding of natural resource problems and aid in their solutions.

The department's curricula are aimed at providing a sound general education and a firm grounding in professional subjects. The Forestry and Master of Forestry curricula meet the accreditation standards of the Society of American Foresters. The department stresses education in biological, physical, and social sciences; humanities; mathematics and computer science; and communication. The forestry curriculum places emphasis on the biological and physical aspects of resource management, while the recreation curriculum places emphasis on the social aspects. These curricula provide a strong background in management science, planning, and policy analysis.

The environmental studies curriculum is designed for students who wish to acquire a broad understanding of natural resources and human-environment relationships, together with the technical background needed to understand environmental issues. In many ways, the curriculum provides a traditional "liberal arts education" with a strong natural resources emphasis. The curriculum has fewer requirements than the other majors and provides flexibility for the development of either specialization or breadth of content to match the student's interests.

Summer Camp. Field instruction at the college-operated summer camp is open to all natural resources majors and is required of students majoring in the forestry and recreation resource management curricula in the Forest Resources Department. Summer camp is normally attended at the end of the sophomore year. Students applying for admission to summer camp should have completed college-level biology and algebra and have a 2.5 GPA in College of Natural Resources courses.

The six-week resident camp is held at a field station in Logan Canyon. In addition to the regular summer session tuition and fees, classes may require lab fees. Board is provided on a cost basis; lodging is without cost.

Bachelor of Science Requirements

Admissions Requirements. Admission requirements for the Department of Forest Resources are the same as those described for the College of Natural Resources (see page 84).

Graduation Requirements. All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

All students earning undergraduate degrees in the College of Natural Resources must complete six core courses in natural resource science and management. In addition, students must complete a series of basic lower-division courses providing the disciplinary foundation for natural resource professions before moving on to professional coursework. Equivalents of these foundation courses can be taken at many of the state's two- and four-year colleges; some schools also offer versions of the lower-division college core courses (NR 1130, 2220, 2340). Some foundation and core courses can also be used toward the University Studies requirement, as marked with an asterisk (*) below.

Forestry Curriculum

The Forestry major consists of 97 credits, including the College of Natural Resources core, lower-division foundation, and professional courses. For most students, these courses will cover all but 9 credits of the University Studies requirement. In addition, students must attend a six-week summer camp based at the college's field station in Logan Canyon, about 20 miles from the University campus. Courses taken during summer camp do not count toward the University's 120-credit minimum.

Lower-division Foundation: Biol 1210, 1220, 1230; Chem 1110; Engl 1010*, 2010*; Math 1100*; Spch 1050*; Stat 2000*; USU 1300*.

College of Natural Resources Core: NR 1130* or Geol 1150*; NR 2220, 2340*, 3000, 3600*, 4000.

Professional Coursework in Forestry: FR 1990, 3200, 3250, 3500, 3700, 4000*, 4250, 4300, 4400, 4520, 4540, 4550, 5420, 5510, 5560; NR 5000; Soil 3000.

Summer Camp: FR 2100, 3100.

Recreation Resource Management Curriculum

The Recreation Resource Management major consists of 97 credits, including the College of Natural Resources core, lower-division foundation, and professional courses. For most students, these courses will cover all but 9 credits of the University Studies requirement. In addition, students must attend a six-week summer camp based at the college's field station in Logan Canyon, about 20 miles from the University campus. Courses taken during

summer camp do not count toward the University's 120-credit minimum.

Lower-division Foundation: Biol 1210, 1220; Chem 1110; Engl 1010*, 2010*; Math 1050*; Soc 1010*; Spch 1050*; Stat 2000*; USU 1300*.

College of Natural Resources Core: NR 1130* or Geol 1150*; NR 2220, 2340*, 3000, 3600*, 4000.

Professional Coursework in Recreation Resource Management: FR 1990, 3250, 3500, 3700, 4000*, 4520, 5560; PRP 4400; RR 4100, 4200, 4300, 4400; Soil 3000; NR 5000; NR 5110 *or* Soc 3500 *or* Soc 4620; 3 credits of special topics or special projects courses (RR 4910 or 4920).

Summer Camp: FR 2100, 3100.

Environmental Studies Curriculum

The Environmental Studies major consists of 85 credits. This total includes the College of Natural Resources core, lower-division foundation, professional courses, and a specialization option of 15 or more credits. Students work with their faculty advisers to develop a specialization option fitting their interests and career goals. Examples of potential options are shown below.

Lower-division Foundation: Biol 1210, 1220, 1230, 1240; Chem 1110; Engl 1010*, 2010*; Math 1050*; Spch 1050*; Stat 2000*; USU 1300*.

College of Natural Resources Core: NR 1130* or Geol 1150*; NR 2220, 2340*, 3000, 3600*, 4000.

Professional Coursework in Environmental Studies: FR 1990, 3250 (or other approved upper-division ecology course), 3500, 4000*; NR 5000; Soil 3000.

Specialization Option: Must consist of 15 or more credits, and may include any approved University minor or a suite of courses meeting the student's particular needs. Examples of specialization options might include:

Environmental Interpretation: NR 5110; RR 4200; Anth 3110 or 4110; Spch 3050*; Art 2810.

Environmental Policy: PolS 3810* or 4810, 4820*; FR 5560; FW 4100; RR 4300; WS 5320.

Environmental Quality Analysis: Chem 1120*; Math 1100*; Phyx 2110*; FR 5350; FW 4500; WS 3700.

Forest Resources Minors

The department offers minors in Recreation Resource Management and Environmental Studies. Students in all University majors may complete a Recreation Resource Management minor. The Environmental Studies minor is open to all majors other than those in the College of Natural Resources. Because the same courses cannot be counted toward both a student's major and minor, students must take additional courses beyond those listed here, if their majors require courses that are also included in either minor. Students wishing to minor in Environmental Studies or Recreation Resource Management should contact the department to meet with the designated adviser for that minor.

The **Environmental Studies minor** totals 16-18 credits, and includes NR 2220, 3000, and 4000, plus two of the following courses: FR 4000; NR 3600; and any approved upper-division course in ecology, policy, economics, or assessment.

The **Recreation Resource Management minor** totals 15 credits, and includes RR 4100, 4200, 4300, and 4400; plus one of the following: FR 4000, NR 5110, and PRP 4400.

Graduate Programs

Admission Requirements

See general admission requirements on pages 60-61. Students applying for admission to the MS, MF, and PhD programs must have quantitative and verbal GRE scores at or above the 40th percentile. Foreign students must have a TOEFL score of at least 550.

Degree Programs

Master of Science. The MS is available to qualified students with bachelor's degrees. Students who do not have undergraduate forestry degrees and who wish to qualify as professional foresters must complete the undergraduate forestry core in addition to the requirements of the MS.

MS curricula may be developed to emphasize **research**, **managerial sciences**, or **administrative sciences**. In a **research** program, the student will be responsible for a specific study leading to a thesis (Plan A). In a **managerial sciences** or **administrative sciences** program, the coursework will be broader and the student will complete an internship or prepare a comprehensive research paper (Plan B).

The MS program consists of at least 30 semester credits in upper-division and graduate-level courses.

Core Requirements. All graduate students must register for FR 6800 every semester. The MS program consists of at least 30 credits in upper-division and graduate-level courses.

Master of Forestry. The MF has been developed to provide an opportunity for professional forestry work at an advanced level. Students entering this program must complete the forestry core requirements, as well as a graduate program in one of the subject areas. This degree is accredited by the Society of American Foresters.

The MF consists of two parts: the forestry core requirement and a 30-credit graduate component.

Core Requirements. The core requirements for the Master of Forestry degree include: FR 3200, 3250, 4300, 4400, 4520, 4540, 5420, 5510; NR 3000, 4000. The graduate component consists of an additional 30 credits. At least 20 credits must be in regular upper-division or graduate-level courses with the remaining 10 credits devoted to directed studies, seminars, problems, and special courses. The coursework is directed toward one of the subject areas of forest biology (silviculture, genetics, ecology), forest management, outdoor recreation, or watershed science. A report is prepared on a selected problem using secondary information and relevant literature. Three special problems credits are given as part of the 30-credit requirement.

Master of Natural Resources. The department also participates in the College of Natural Resources Master of Natural Resources (MNR) degree program. For more information, see page 309.

Doctor of Philosophy. The PhD degree is offered in Forestry, Forest Ecology, and Recreation Resources Management. The PhD is a terminal degree and is awarded upon successful completion of a comprehensive program of coursework and original research in one of the above subject areas. It is a research degree in which the major part of the curriculum is directed toward coursework relative to the area of research.

Core Requirements. All PhD students must register for FR 7800 every semester.

Research

Cooperation with other departments, with research centers of the University, and with government collaborators permits strong graduate programs in all phases of natural resources-related sciences. Particular mention should be made of the University's Ecology Center, in which the Forest Resources Department is very active; the Utah Agricultural Experiment Station, which has a full program in both applied and basic natural resources research; the Center for Water Resources Research, which sponsors forest watershed research; the Natural Resources and Environmental Policy Program, an interdisciplinary academic program focusing on natural resources and environmental policy issues; the Institute for Outdoor Recreation and Tourism, which conducts recreation and tourism research and outreach education; and the U.S. Forest Service Rocky Mountain Research Station, which maintains a research center on campus.

Financial Assistance

Research assistantships are available through faculty members having ongoing projects with the Utah Agricultural Experiment Station or holding special research grants from the University, private entities, or governmental agencies.

Acceptance to pursue graduate study does not guarantee the student financial assistance.

Forestry Courses (FR)

1990. Professional Orientation Seminar. Introduction to forestry, outdoor recreation, environmental studies, and related careers. Offers new students an orientation to college and University programs, careers in natural resources, faculty, and professional societies. (1F)

2100. Forest Inventory. Intensive field study of timber volume and inventory techniques. Survey methods employed in natural resource management. Taught during summer camp. (3Su)

2200. Basic Wildfire Suppression. Trains individuals in basic wildfire behavior and suppression. Qualifies student to function as a member of a wildfire suppression crew. (2Sp)

3100. Forest Practice. Field study of forest growth and succession. Field identification of plant species. Assessment techniques for forest resources and uses. Taught during summer camp. Prerequisite: FR 2100 (may be taken concurrently). (3Su)

3200. Biology of Woody Plants. Introduction to biology of woody plants, including their morphological, anatomical, physiological, and reproductive attributes; evolutionary relationships; distribution patterns; and utility to humans. Prerequisites: Biol 1210, 1220, or permission of instructor. (4F)

3250. Forest Ecology. Principles and concepts of forest ecology. Forest environments, woody plant ecophysiology, forest ecosystem structure and function, and forest community ecology. (4F)

3500. Computer Applications in Natural Resources. Advanced speadsheet, graphics, aerial photography, and Geographic Information Systems for natural resource management. (3F)

3700. Fundamentals of Watershed Science. Study of water movement, hillslope processes, and nutrient movement in catchments, and its relevance to the properties, land use, and management of watersheds as natural resource units. Prerequisite: Soil 3000 or permission of instructor. (3Sp)

DSS 4000. Human Dimensions of Natural Resource Management. Focuses on balancing science and social values in ecosystem management and decision-making. Topics include environmental justice, communication and behavior change strategies, landscape perception and attitudes, sociology of resource-dependent communities, and conflict management. (3F)

4250. Silviculture. Application of principles and concepts from forest ecology to control the establishment, composition, structure, and growth of forests to achieve the objectives of management. Prerequisite: FR 3250. (4F)

4300. Forest Measurements. Measurements of timber in log, tree, and stand; log rules and scaling; statistical methods useful in analyzing forest data; and timber cruising practices. Prerequisites: Stat 2000, Math 1100, NR 3600, FR 3500. (3Sp)

4400. Forest Management and Economics. Integrates economic and decision-making tools in management of forest resources for multiple uses over extended time periods. Prerequisites: NR 4000, FR 4250. (4Sp)

4520. Wildland Fire Management and Planning. Fire as a resource management tool, with applications in forest, range, and wildlife management. Fire ecology, policy, prescription planning, economics, behavior, and management. (2Sp—2nd Half)

4540. Forest Harvest and Utilization. Elements of timber harvest systems, including policies and practices for minimizing biophysical impacts. Utilization of wood resources. (2F)

4550. Forest Recreation. Principles of wildland recreation management, characteristics of recreation use and users, planning concepts, and integration of recreation with other forest uses. Not available for credit in Recreation Resource Management major or minor. Half-semester course. (2F)

4800. Undergraduate Research. Individual or team research. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4910. Directed Study. (1-6F,Sp,Su) ®

4980. Co-op Education and Internship. Directed and evaluated cooperative education or work experience for undergraduates in public and private organizations. (1-6F,Sp,Su) ®

****5250. Principles and Practices of Intensive Silviculture.** Familiarizes student with silvicultural methods appropriate for intensive forest management, including artificial regeneration and the assessment and control of basic growth and yield relations. Prerequisite: FR 4250. (3Sp)

5320. Water Law and Policy in the United States. Introduction to policies, laws, institutions, and practices guiding western water allocation, emphasizing how to efficiently and equitably allocate increasingly scarce supplies. Explores reserved water rights, water markets, stream adjudication, public trust doctrine, basinwide management, and riparian management. (3F)

5350 (d6350).[1] Wildland Soils. Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: General chemistry, Soil 3000, and one other upper-division Soils course, or permission of instructor. (3Sp)

CI 5420. Forest Pathology. Nature, cause, and management of forest diseases. (2Sp)

5430. Advanced Forest Pathology. In-depth exploration of forest pathology issues, focusing on ecosystem-level processes. (2Sp)

5510. Forest Entomology. Basic insect taxonomy, life histories, structure, and function. Ecological relationships, recognition, and management of insects of economic importance to forestry. Prerequisite: Basic entomology or biology. (2F—1st Half)

5560. Natural Resources Law and Policy. Legal and administrative regulation of forests and associated resources (water, air, fish, wildlife, and scenery). Emphasis on agency organizational culture, federal legislation, court cases, administrative procedures, and federal natural resources agencies' interactions with tribal, state, and local governments. (2F)

5650. Urban/Community Forestry. Social, biological, and administrative aspects of managing urban/community forests, including field and classroom exercises and a management planning project. (3Sp)

5710. Disturbance Ecology in Forested Systems. Examines effects of disturbance on forest ecosystems. (3Sp)

5980. Graduate Co-op Education and Internship. Directed and evaluated cooperative education or work experience for graduate students working in public or private natural resource-related organizations. (1-6F,Sp,Su) ®

6000. Human Dimensions in Natural Resources Graduate Seminar. Focuses on balancing science and social values in ecosystem management and decision-making. Topics include environmental justice, communication and behavior change strategies, landscape perception and attitudes, sociology of resource-dependent communities, and conflict management. Students attend lectures concurrent with FR 4000, but attend one additional discussion section per week. (3F)

****6200. Biogeochemistry of Terrestrial Ecosystems.** Inputs, outputs, and cycling patterns of major nutrients. Emphasis on mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: Biol 1220, Soil 3000, Chem 2300 or 2310, or permission of instructor. (3F)

6350 (d5350). Wildland Soils. Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: General chemistry, Soil 3000, and one other upper-division Soils course, or permission of instructor. (3Sp)

6420. Advanced Forest Management. Advanced study of forest-level planning on public and private lands using mathematical programming techniques. Prerequiste: FR 4400 or equivalent. (2Sp)

****6530. Natural Resources Administration.** Organizational structures and processes common in natural resources administration on federal and state levels, and how they impact career development and land management. (2F)

6700. Forest Ecology. Structure and function of forest ecosystems. Woody plant ecophysiology, environmental biophysics, population and community ecology of forests. Forest vegetation dynamics and succession. Prerequisite: NR/Biol/FW 2220 or equivalent. (3Sp)

6750. Plant Community Ecology. Theory and concepts of plant community ecology. Plant community composition, distribution in space, and dynamics in time. Species environmental response models, competition theory, statistical predictive models, and concepts of multivariate analysis in plant ecology. Prerequisites: NR/Biol/FW 2220 or equivalent; and ecology core courses (may be taken concurrently). (3F)

6800. Forest Resources Departmental Seminar. (1F,Sp) ®

6810. Natural Resources Research Design. Covers generation of practical research hypotheses and their testing in the natural resource research context. Written reports, such as journal articles, in the natural resources fields are deconstucted according to research methodologies. Prerequisite: Any statistics course which includes hypothesis testing and confidence intervals. (3F)

6820. Natural Resources Research Integrity. Given as a seminar, and including invited speakers, course covers responsible professional behavior in natural resources research and management, with topics ranging from regulations for laboratory animal welfare to performance of honest research and management in the natural resources professions, where studies are seldom replicated and planning horizons can be decades away, and checks for ultimate validity not performed. As a term project, each student devises and defines his/her code of natural resources professional integrity. Recommended prerequisite: FR 6810. (2F)

6870. Ecology Seminar. The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. (1F) ®

6910. Directed Study. (1-6F,Sp,Su) ®

6960. Graduate General Ecology. General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic enviroments. (5F)

6970. Thesis Research. (1-10F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7420. Analysis of Vegetation Patterns. Advanced treatment of vegetation sampling, classification, and ordination between stands over landscapes, designed primarily for researchers. Prerequisites: EC (core), RLR 6420, FR/RLR 6750, Stat 5200, and familiarity with computers. (5Sp)

7800. Forest Resources Departmental Seminar. (1F,Sp) ®

7970. Dissertation Research. (1-10F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

Recreation Resource Management Courses (RR)

4100. Wildland Recreation Behavior. Social, psychological, and geographic influences on human behaviors in wildland recreation settings. Emphasis on critical problems affecting public land recreation management. (3Sp)

4200. Natural Resource Interpretation. Planning processes and techniques for interpretive programs developed for wildland recreation areas and visitor centers. Evaluation and planning of visitor information efforts. (3F)

4250. Recreation Park and Facility Management. Study of recreation park and

facility management, including examination of supply, demand, population, maintenance, and safety in developing appropriate areas and facilities for parks. (3Sp)

4300. Recreation Policy and Economics. Fundamentals of public land recreation administration, including funding, laws and regulations, partnerships, and government agency culture. Application of nonmarket and regional economics to wildland recreation. Relationship of outdoor recreation to tourism. (3F)

4400. Wildland Recreation Planning and Management. Planning and management tools for wildland recreation management. Biophysical impacts of recreation. Integration of recreation with other natural resource uses. Prerequisites: RR 4100, 4300, and senior standing. (3Sp)

4800. Undergraduate Research. Individual or team research. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4910. Special Topics in Recreation Management. Irregularly scheduled courses on issues of recreation interest, such as wilderness management, ecotourism, recreation outfitting, etc. At least one such course offered each year, with most courses taught less than full semester. (1-3) ®

4920. Special Projects in Recreation Management. Participation in special projects to assist public recreation agencies or nonprofit organizations, while gaining hands-on experience in recreation management, planning, and monitoring. Many experiences entail intensive, short-duration efforts away from campus. (1-3) ®

4980. Co-op Education and Internship. Directed and evaluated cooperative education or work experience for undergraduates in public and private organizations. (1-6F,Sp,Su) ®

5980. Graduate Co-op Education and Internship. Directed and evaluated cooperative education or work experience for graduate students working in public or private natural resource-related organizations. (1-6F,Sp,Su) ®

6100. Behavioral Aspects of Wildland Recreation. Social and psychological analysis of visitor behavior in outdoor recreation settings. Sources of recreation management problems and practical and theoretical basis for management practices. Lectures concurrent with RR 4100. Separate discussion sessions focus on research concerning recreation behavior. (3F)

6300. Policy Aspects of Wildland Recreation. Political, legal, and economic bases for wildland recreation management. Relationship between outdoor recreation and tourism. Lectures concurrent with RR 4300. Also includes weekly discussion session focusing on relevant scientific research and policy analyses. (3Sp)

***6400. Ecological Aspects of Wildland Recreation.** Assessment of current knowledge and knowledge gaps concerning impacts of wildland recreation on wildlife, plants, soil and water resources, and processes. Strategies for coexistence of recreation visitors and nonhuman ecosystem elements. (3Sp)

6800. Forest Resources Departmental Seminar. (1F,Sp) ®

6910. Directed Study. (1-6F,Sp,Su) ®

6970. Thesis Research. (1-10F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7800. Forest Resources Departmental Seminar. (1F,Sp) ®

7970. Dissertation Research. (1-10F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Geography and Earth Resources

College of Natural Resources

Acting Head and Undergraduate Program Coordinator: Associate Professor *Ted J. Alsop*, physical geography, climatology, geomorphology, photogrammetry, North America
Office in Biology-Natural Resources 287, (435) 797-1790

Graduate Program Coordinator: Professor *Derrick J. Thom*, land use, population and settlement, rural development, remote sensing, Africa
Office in Natural Resources 232, (435) 797-1292

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WWW http://www.nr.usu.edu/Geography-Department/GER.html

Professor *Clifford B. Craig*, geographic education, community development, rural planning, economic, Utah; **Associate Professors** *R. Douglas Ramsey*, remote sensing, geographic information systems, landscape ecology, spatial analysis; *John C. Schmidt*, hydrology, fluvial geomorphology, mineral and water development policy; **Assistant Professors** *Paul W. Box*, human ecology, recreation, Africa, spatial analysis, simulation, geographic information systems; *Robert R. Gillies*, climatology, SVAT modeling, remote sensing, earth-surface-atmosphere interactions; *Laura E. McCarthy*, remote sensing, cartography, physical, environmental impact; **Research Assistant Professor** *Sharon C. Ohlhorst*, environmental education, marine biology, ecology; **Instructor** *Roger L. Perkins*, political science, regional geography

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in Geography

Graduate specializations: Climatology/Climatic Change/Atmospheric Modeling, Geographic/Environmental Education, Physical Geography/Ecology, Remote Sensing/Geographic Information Systems/Automated Cartography, River Processes/Fluvial Geomorphology, Rural Development/Land Use Planning/Land Use Analysis

Undergraduate Programs

Objectives

The undergraduate program provides a broad background in the systematic foundation themes of geography—human (cultural), physical, and regional geography—with a particular focus on environmental and earth resources geography. In addition, students acquire technical geographic analysis skills: map and airphoto interpretation, cartographic design, geographic information analysis, remote sensing, and field/statistical research methods. These fundamental conceptual and technical skills prepare the student to continue on to graduate school or to seek professional employment in the public or private sector.

Besides acquiring fundamental geographic skills and knowledge, students have the opportunity to study in a systematic, regional, or technical area of geography. Students may choose among courses both outside and within the department. Faculty within the department conduct research and teach specialized courses in a diversity of systematic physical geography areas, including geomorphology, water resources, biogeography, climatology, and human-environment interaction. Courses with human/cultural geographic themes, such as cultural ecology, international rural development, geographic and environmental education, and political, economic, and settlement/population geography, are also taught. Students wishing to focus on regional studies may choose from courses on Europe, Africa, Latin America, the Pacific Rim, North America, the Middle East, and Utah, as well as on ecosystem-oriented regions such as mountain lands or arid/semi-arid lands.

The Department of Geography and Earth Resources maintains laboratories with state-of-the-art equipment for research and teaching in the fields of satellite remote sensing, digital image processing, automated mapping, geographic information systems, map analysis, and environmental modeling. Geography majors can apply for scholarships, internships, and assistantships offered by the Geography and Earth Resources Department and the College of Natural Resources, or may qualify for part-time employment with ongoing research projects receiving funding in the Geography and Earth Resources Department.

Requirements

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to this major. Transfer students from other institutions or other USU majors need at least a 2.5 cumulative GPA for admission in good standing.

Geography Major. Every geography major is required to complete a minimum of 36 semester credits in geography courses. A grade of *C* or better is required in all geography courses used to meet the requirements for a major, minor, teaching major, or teaching minor in geography. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

Required courses include: Geog 1030, 1130, 1140, 3330, 3900, 4200, and 5880. The remaining geography courses should be at or above the 3000 level. Students will usually also take Math 1050 and Stat 2000. In addition, all majors must meet the core curriculum requirements of the College of Natural Resources (NR 2220, 2340, 3000, 3600, 4000).

The geography program offers the student an opportunity to study physical, human, and regional geography, and to study particular methods and techniques. Students interested in one or more of these areas should consult their adviser for guidance in the selection of appropriate electives, including courses from other departments.

Geography Minor (24 credits minimum). A Geography minor requires four courses chosen from Geog 1030, 1130, 1710, 2030, 2230, and two technique courses (Geog 3850 and 3900). Students must complete at least one regional course and one systematic course at or above the 3000 level. The preceding courses total 24 credits, without any additional courses, to meet the 24-credit minimum requirement.

Geography Teaching Major (36 credits minimum). Required courses include: Geog 1030, 1130, 1140, 2030, 3330, and 4200 (Utah); required methods and techniques courses are Geog 3850 and 4800; and required classroom practicum course is Geog 4300. Students may select their remaining 11 credits of electives from courses numbered 2000 or above. It is recommended that students take additional regional, systematic, technology in geography education, or classroom technology practicum credits. All electives must be coordinated with a geography education adviser.

Geography Teaching Minor (22 credits minimum). The following courses are required: Geog 1030, 1130, 1140, 2030, 3330, and 4200. Teaching minors are encouraged to take additional courses from both regional and systematic areas of geography.

Graduate Programs

Admission Requirements

In addition to admission requirements described in the Graduate Studies portion of this catalog (see pages 60-61), the Department of Geography and Earth Resources requires students applying for admission to the MS or MA program to take the Graduate Record Examination (GRE) with quantitative and verbal scores above the 40th percentile and a combined score of at least 1,100. Scores must be sent with the application. Previous training in geography is not a prerequisite for admission.

MS and MA Specializations

Students in the Master of Science and Master of Arts programs may select an area of emphasis for research and study from the following specializations: Climatology/Climate Change/Atmospheric Modeling, Geographic/Environmental Education, Physical Geography/Ecology, Remote Sensing/Geographic Information Systems/Automated Cartography, River Processes/Fluvial Geomorphology, Rural Development/Land Use Planning/Land Use Analysis.

Master of Natural Resources. The department also participates in the College of Natural Resources Master of Natural Resources (MNR) degree program. For more information, see page 309.

Course Requirements

While each program specialty area within the department varies in specific requirements, students will, in general, take courses in the following four areas: (1) a basic departmental core, emphasizing history of geographic thought, graduate colloquia, and thesis research; (2) selected methodology and research techniques specified by the supervisory committee; (3) specialized courses within the thematic and regional specialty; and (4) electives.

Graduation requirements described in this catalog are subject to change. Students should check with the department concerning possible changes.

Core Courses. Students will be required to complete the following courses within their first year of residency:

First year: *fall semester:* Geog 6700 (3 credits); Geog 6980, ST: Colloquium (1 credit); *spring semester:* Geog 6980, ST: Graduate Seminar (1 credit).

Research

Students are encouraged to maintain close contact with their adviser and other members of their graduate committee while they conduct their research and write the thesis or project report. Such contact serves several functions: (1) It allows students to benefit from the expertise of individual committee members; (2) it helps students to avoid pitfalls or wasted time; and (3) it informs committee members of each student's research progress.

Students are particularly urged to confer with members of their graduate committee at critical times in the research program, such as when data collection is finished and prior to beginning analysis of the results (Plan A), and when considering the broad organization of the Plan B project activity and report.

Financial Assistance

Research assistantships may be available through the individual research programs of major professors. Teaching assistantships may be available through the department. All awards are made on a competitive basis and depend upon specific research and teaching needs. Admission to the graduate program of the Department of Geography and Earth Resources does not guarantee financial support.

Career Opportunities

Geographic training prepares students for many types of careers, with a variety of employers, in the private, public, and academic sectors.

In the **private sector**, geographers may be hired to undertake locational analyses or environmental impact statements for businesses. Cartographers and remote sensing specialists are hired by the private sector. Others with geographic information systems (GIS) skills and those with socioeconomic training are hired as planners in a variety of business and commercial careers. Physical geographers are hired in the fields of resource development, environmental assessment, and advocacy and resource management.

In the **public sector**, at all levels of government—local state, and federal—geographers are hired to undertake a variety of tasks. Geographers may work for local and state economic development offices, conduct research about recreation and park utilization, or map land use from remotely sensed data. At the federal level, geographers often work for the Bureau of Land Management, the National Oceanic and Atmospheric Administration, the Forest Service, the U.S. Geological Survey, the Defense Mapping Agency, the National Aeronautics and Space Administration, the Department of State, and the U.S. Census Bureau. Physical geographers work as hydrologists and physical scientists with many agencies.

Geography Courses (Geog)

BSS 1030. World Regional Geography. Survey of world cultural regions, with an analysis of political, economic, and resource patterns in their physical setting. (3F,Sp,Su) ©

BPS 1130. Physical Geography. Geographic analysis of physical processes and spacial distribution of natural elements (i.e., the atmosphere, hydrosphere, lithosphere, and biosphere). (3F,Sp,Su) ©

1140. Physical Geography Lab. Laboratory exercises in natural physical geography. Provides initial field and laboratory experiences in the earth system. Required for all geography majors. Prerequisite: Geog 1130 (may be taken concurrently). (1F,Sp)

1710. Human Impact on Environment. Provides assessment of natural and man-related processes acting together to modify the global environment. Examines nature of global environmental change and contribution of human species to this change. (3Sp)

BSS 2030. Human Geography. Spatial study within selected socio-cultural settings, including cultural landscapes, rural-urban linkages, languages, religions, politics, and economic activities. (3F)

2130. Population Geography. Spatial analysis of demographic data emphasizing global distribution, population growth, measures of density, migration, settlement, and economic development. (3Sp)

2230. Economic Geography. Introduction to analysis of world patterns of economic activities (production, consumption, and exchange), with emphasis on factors of industrial location and natural resource exploitation. (3F)

DSC 3000. Oceanography. Examines fundamental interrelationships between physical environment of the oceans and the life forms they support. Suitable for nonbiologists. (3Sp)

3330. Environment and Society. Emphasizes how human actions modify the physical environment and how physical systems affect human systems and the changes occurring in the meaning, use, and importance of resources at a global and regional scale. (3Sp)

3430. Political Geography. Study of relationship between Earth, people, and the state. Global political phenomena studied from a geographic perspective. Explores

impact of natural resources territorial seas and the nature of the state. (3Sp)

3500. Computer Applications in Natural Resources. Advanced speadsheet, graphics, aerial photography, and Geographic Information Systems for natural resource management. (3F)

3600. Geomorphology. Geomorphic processes, origin of land forms, and characteristics of surficial (unconsolidated) deposits. Emphasizes glacial, fluvial, and lacustrine environments; and surficial geologic mapping. Three one-hour lectures and one three-hour lab per week. Prerequisite: Geol 1100 or 1150 or Geog 1130. (4F)

3610. Geography of Rural/Urban Planning. Analysis of the organization and interrelationships of urban-city and rural space. Emphasizes spatial planning of rural-urban environments to improve quality of life, internal structure of cities, and applied principles and practices of community planning. Field trips and applied class projects integrated into lectures and demonstrations. (3F)

3750. Fundamentals of Remote Sensing. Develops in a conceptual manner the scientific principles behind remote sensing. Examines the basic physics of electromagnetic radiation and the interactions of radiation with the surface and the atmosphere. (3Sp)

DSC, QI 3820. Global Climatology. Emphasizes physical basis of climate (climate dynamics) and the mechanisms and processes for its fluctuations on sub-seasonal to interannual time scales (climate variations), and on regional to hemispheric/global time scales. Prerequisite: Bmet 2000 or Geog 1130. (4F)

3850. Map Interpretation and Design. Philosophical, theoretical, and practical nature of maps, with emphasis on map reading, interpretation, and analysis. (3F)

3900. Spatial Analysis. Analysis of geographic data, including spatial economic theory, spatial quantitative methods, and spatial distributions. (3)

CI 4200. Regional Geography. Analysis of physical and cultural geography for a variety of regions. Can be repeated for each different region as offered (e.g., Pacific Rim, Africa, Middle East, Europe, Asia, Latin America, and North America). (3F,Sp,Su) ® ©

4250. Advanced Cooperative Internship. Cooperative education/work experience; increased complexity and a more professional level of experience as student advances toward completion of the program. Credit arranged. (1-10) ®

4300. Geography Education Classroom Practicum. Allows geography education students to participate in actual geography classroom teaching with experienced geography teachers. Students observe, work with individuals and groups of students, team-teach lesson(s) with the teacher, and self-teach individual lesson(s). (1-3F,Sp,Su) ®

4750. Geographic Applications in Remote Sensing. Overview of remote sensing systems, including principles, techniques, and applications of both aerial photography and satellite images. Provides information needed to understand and apply remote sensing to a wide range of resource applications. (3F)

4800 (d6800)[1]. Teaching Geography. Designed specifically for geography education/social studies education students preparing to teach grades K-12. Exploration of national and state standards and core curriculum, as well as state-of-the-art geography education technology and teaching resources. Students develop teaching lessons, and gain classroom teaching experience with local geography teachers. (3Sp)

4850. Cartographic Design. Techniques used in design and construction of maps, charts, and map projections. (3Sp)

4920. Undergraduate Research. Individual or team research. Prerequisite: Adviser approval. (1-3F,Sp,Su) ®

4930. Geographic Information Systems. Examines structure and operation of Geographic Information Systems (GIS). Explores design, theory, and implementation of GIS software, digitizing, fundamentals of vector and raster GIS processing, georeferencing, map accuracy, and site location. (3F)

5100 (d6100). Methods of Environmental and Ecological Mapping. Mapping in the field from aerial photography and satellite data to mapping environmental regions and establishing a GIS data base. (3Sp)

5110. Environmental Education. Covers teaching about the environment, and using the environment and the natural world to teach other subjects, with a strong emphasis on participation and on practicing teaching techniques. (3Sp)

5150 (d6150). Fluvial Geomorphology. Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisites: Calculus, physics, applied hydraulics, and geomorphology. (4F)

5160 (d6160). Hillslope Geomorphology. Focuses on movement and storage of sediment on hillslopes and in small channel systems. Develops understanding of processes responsible for shaping hillslopes, and examines effects of land management on those processes. Prerequisites: Geog 1130, Geol 1100, or WS 3700. (3F)

5330 (d6330). Large River Basin Management: History, Politics, and Science. Focuses on constituencies participating in modern management of large river basins, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (3Sp)

5540 (d6540). Land Use and Resource Assessment. Provides understanding of land use, land capability, techniques and methods of resource assessment, and their role in development planning. (3F)

5550 (d6550). Environment, Resources, and Development Policy. Environment, natural resources, and development policy in Third World, emphasizing sustainable development, farming systems, agro-pastoralism, desertification, and land use. (3F)

CI, DSS 5650 (d6650). Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

***5660. Restoration of Wildland Watersheds.** Features problem analysis, objective setting, and application of methods and monitoring. Provides detailed exploration of implications of restoration treatments to: the partitioning and timing of water through the hydrologic cycle, stream channel and hillslope stability relationships, sediment and nutrient fluxes, biodiversity and productivity, and land management. Prerequisites: WS 4490, 5150, 6800; RLR 5610 (or equivalent). Registration by Watershed Science majors requires permission of the Watershed Unit director. (3Sp)

5670. Restoration of Wildland Watersheds Practicum. Practical field-oriented course to accompany Geog/RLR/WS 5660. (1Sp)

5700 (d6700). History of Geographic Thought. Acquaints students with aims, methods, and accomplishments of geography as a professional field and a discipline in the past, present, and future. (3F)

5750 (d6750). Applied Remote Sensing. Covers the application of remote sensing to landcover mapping and resource monitoring at a quantitative level. Students instructed on the effects of atmosphere and surface interaction on the reflectance collected by electro-optical sensors, as well as on the proper use and interpretation of various calibration and classification algorithms. (3Sp)

5760 (d6760). Remote Sensing: Modeling and Analysis. Advanced techniques in the analysis of the earth's surface using remotely-sensed imagery and data in a digital format. Projects employ and/or develop research models. (3Sp)

5810 (d6810). Geography Education Inservice Workshop. Assists classroom teachers in broadening their perspective of Geography Education through increased knowledge, improving their geographic techniques, methods, and teaching resources for their classrooms. (3F,Sp,Su)

5880. Senior Research Seminar. Utilizing techniques and resources in geographic research, each student designs, conducts, and produces a major geography research project. (3Sp)

5900 (d6900). Geography Field Practicum. Designed for geography students involved in field research and/or internships. Provides opportunity for students to gain practical applied experience in their specialized academic emphasis in geography (1-4F,Sp,Su) ®

5930 (6930). Geographic Information Analysis. Techniques of geographic information systems, data structures, data input and output, and data manipulation and analysis. (3Sp)

5970. Classroom Technology in Geography Education. Design, development, and application of contemporary technologies and multimedia classroom teaching resources for preservice and inservice geography education teachers. (3F,Su)

5980 (d6980). Special Topics. Provides special insights and in-depth study of topics of present concern. (1-3F,Sp,Su) ®

5990. Readings and Conference. Provides one-on-one interaction between student and instructor. (1-3F,Sp,Su) ®

6100 (d5100). Methods of Environmental and Ecological Mapping. Mapping in the field from aerial photography and satellite data to mapping environmental regions and establishing a GIS data base. (3Sp)

6150 (d5150). Fluvial Geomorphology. Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisites: Calculus, physics, applied hydraulics, and geomorphology. (4F)

6160 (d5160). Hillslope Geomorphology. Focuses on movement and storage of sediment on hillslopes and in small channel systems. Develops understanding of processes responsible for shaping hillslopes, and examines effects of land management on those processes. Prerequisites: Geog 1130, Geol 1100, or WS 3700. (3F)

6200. Advanced Regional Geography. Critical analysis of world's regions, focusing on analysis and synthesis of a region's economic, political, population, and cultural themes in the context of physical environment and global processes. Repeatable for different regions. (3F,Sp,Su) ®

6250. Graduate Cooperative Internship. Graduate-level educational work experience in which student combines scholarly expertise with on-the-job application. (1-9F,Sp,Su) ®

6330 (d5330). Large River Basin Management: History, Politics, and Science. Focuses on constituencies participating in modern management of large river basins, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (3Sp)

6540 (d5540). Land Use and Resource Assessment. Provides understanding of land use, land capability, techniques and methods of resource assessment, and their role in development planning. (3F)

6550 (d5550). Environment, Resources, and Development Policy. Environment, natural resources, and development policy in Third World, emphasizing sustainable development, farming systems, agro-pastoralism, desertification, and land use. (3F)

6650 (d5650). Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

6700 (d5700). History of Geographic Thought. Acquaints students with aims, methods, and accomplishments of geography as a professional field and a discipline in the past, present, and future. (3F)

6740. Physical Processes in Remote Sensing. Assures that students are well-versed in the science and technology of remote sensing. Covers various algorithms and their ability to extract biophysical information from remotely sensed images. Helps students gain firm knowledge of the capabilities and limitations of these algorithms and their use in understanding landscape level biophysical interactions. (3F)

6750 (d5750). Applied Remote Sensing. Covers the application of remote sensing to landcover mapping and resource monitoring at a quantitative level. Students instructed on the effects of atmosphere and surface interaction on the reflectance collected by electro-optical sensors, as well as on the proper use and interpretation of various calibration and classification algorithms. (3Sp)

6760 (d5760). Remote Sensing: Modeling and Analysis. Advanced techniques in the analysis of the earth's surface using remotely-sensed imagery and data in a digital format. Projects employ and/or develop research models. (3Sp)

6800 (d4800). Teaching Geography. Designed specifically for geography education/social studies education students preparing to teach grades K-12. Exploration of national and state standards and core curriculum, as well as state-of-the-art geography education technology and teaching resources. Students develop teaching lessons, and gain classroom teaching experience with local geography teachers. (3Sp)

6810 (d5810). Geography Education Inservice Workshop. Assists classroom teachers in broadening their perspective of Geography Education through increased knowledge, improving their geographic techniques, methods, and teaching resources for their classrooms. (3F,Sp,Su)

6900 (d5900). Geography Field Practicum. Designed for geography students involved in field research and/or internships. Provides opportunity for students to gain practical applied experience in their specialized academic emphasis in geography (1-4F,Sp,Su) ®

6910. Independent Research. Allows one-on-one research between student and instructor. (1-6F,Sp,Su) ®

6930 (5930). Geographic Information Analysis. Techniques of geographic information systems, data structures, data input and output, and data manipulation and analysis. (3Sp)

6960. Thesis Design. Identification of thesis topics. Design, writing, and presentation of thesis. (3F,Sp,Su) ®

6970. Thesis Research. (1-12F,Sp,Su) ®

6980 (d5980). Special Topics. Provides special insights and in-depth study of topics of present concern. (1-3F,Sp,Su) ®

6990. Continuing Graduate Advisement. Provides graduate students with access to academic program advisers. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Geology

College of Science

Head: Associate Professor *Donald W. Fiesinger,* igneous petrology
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Professors *James P. Evans,* structural geology, structural petrology; *W. David Liddell,* paleoecology, invertebrate paleontology; *Robert Q. Oaks, Jr.,* sedimentary petrology, stratigraphy; **Professor Emeritus** *Clyde T. Hardy,* structural geology; **Associate Professors** *Susanne U. Janecke,* tectonics, structural geology; *Peter T. Kolesar,* carbonate petrology; *Thomas E. Lachmar,* hydrogeology; **Adjunct Associate Professor** *John C. Schmidt,* fluvial geomorphology

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Geology; BS in Composite Teaching in Earth Science; MS in Geology Ecology

Undergraduate emphases: *BS in Geology*–General Geology, Hydrogeology-Engineering Geology, and Geoarchaeology; **Graduate Specializations:** *MS in Geology*–Geochemistry, Hydrogeology, Igneous Petrology, Paleoecology, Sedimentary Geology, Structural Geology, and Surficial Geology

Undergraduate Programs

Objectives

Geology is the study of the planet Earth, the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin. Geology considers the physical forces that act within and on the Earth, the chemistry of its constituent materials, and the biology of its past inhabitants as revealed by fossil evidence. Geologists integrate biology, chemistry, engineering, mathematics, and physics in the study of our natural surroundings. The knowledge thus obtained is used by geologists to explore for energy, mineral, and water resources; to identify geologically stable sites for major structures; and to provide foreknowledge of some of the dangers associated with the mobile forces of a dynamic Earth. Geologists provide fundamental information required by modern society to plan for cultural and industrial development, reduce geological hazards, identify potential resources, and assist in the design of waste-disposal facilities.

The Department of Geology prepares students for professional careers in the geosciences and provides the background required for advanced studies. The department offers three options of study to meet the growing demand for geoscientists with training in general geology, hydrogeology-engineering geology, or geoarchaeology. All options provide exposure to the sciences and an appreciation of our physical surroundings. The BS program in Geology meets the curriculum standards established by the American Institute of Professional Geologists.

The department also offers the Composite Teaching Major in Earth Science to prepare teachers of earth science at the secondary school level. Requirements for this major meet or exceed the standards of the National Science Teachers Association. Those students who major in earth science should be aware that state certification is required of secondary education teachers. The Composite Teaching Major in Earth Science fulfills the requirements that provide eligibility for certification. Certification requirements vary from state to state, and students should investigate the requirements for the states in which they intend to seek employment. Advising for the professional education component and State of Utah secondary education certification is provided by the USU Department of Secondary Education.

The Department of Geology is housed within the Geology Building, which is located at the northeast corner of the Old Main Quad. Renovated in 1988-89, the Geology Building provides spacious well-equipped teaching labs, classrooms, and facilities, including a display and study area for students, computer access, document room, map room, preparation facilities, and research labs.

General College of Science Requirements

All general College of Science requirements are imbedded within the various major requirements listed below. No extra coursework is required to fulfill the general college requirements.

Requirements

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to this major. Transfer students from other institutions need a 2.2 GPA, and students transferring from other USU majors need a 2.0 GPA for admission to this major in good standing. Students seeking admission to the Composite Teaching Major in Earth Science should be aware that a 2.75 minimum GPA is required for admission to the Teacher Education Program in the Department of Secondary Education.

Field Trips and Labs. Most Geology courses have required laboratories and/or field trips. Those enrolled are expected to dress properly for the conditions and observe safety precautions issued by the instructors. Most courses require modest lab fees.

Bachelor of Arts Degree. For a BA in Geology, the foreign-language requirement must be satisfied in addition to the Bachelor of Science in Geology requirements.

Bachelor of Science Degree in Geology. Three options of study are available for a BS in Geology: General Geology, Hydrogeology-Engineering Geology, and Geoarchaeology. For a **BS in Geology (General Geology option)**, the following courses are required: Geol 1150, 3200, 3500, 3550, 3600, 3700, 4500, 4700, 5200; Chem 1210, 1220, 1230, 1240; Phyx 2210, 2220; Math 1210; Stat 3000; CS 2600 or CEE 5190 or Geog 4930; 6 credits minimum in Applied Geology selected from the following: Geol 5510, 5520, 5530, 5540; 6 credits minimum in Earth Materials and Processes selected from the following: Geol 5410, 5420, 5430, 5440, 5450, 5460, 5470; 5 credits minimum in Integration and Synthesis selected from the following: Geol 5600, 5610, 5620, 5630, 5640, 5650.

For a **BS in Geology (Hydrogeology-Engineering Geology option)**, the following courses are required: Geol 1150, 3200, 3500, 3550, 3600, 3700, 4700, 5200, 5510, 5600; Chem 1210, 1220, 1230, 1240; Phyx 2210, 2220; Math 1210, 1220, 2250; CS 2600; Engr 2000, 2040; CEE 3030, 3500; CEE 3430 or 4300; Soil 3000 or 5130.

For a **BS in Geology (Geoarchaeology option)**, the following courses are required: Geol 1150, 3200, 3500, 3550, 3600, 3700, 4700, 5430, 5640; Chem 1210, 1220, 1230, 1240; Biol 1210, 1220, 1230, 1240; Math 1210; Stat 3000; CS 2600 or CEE 5190 or Geog 4930; Anth 1030, 3250, 3300, 4250, 4350, 4360, 5300; Soil 3000 or 5130.

Bachelor of Science Degree in Composite Teaching—Earth Science. For the BS in Composite Teaching—Earth Science, the following courses are required: Geol 1150, 2500, 3200, 3500, 3550, 3600, 3700, 4700; Chem 1210, 1220, 1230, 1240; Phyx 1020, 2210, 2220; Math 1210; Stat 3000; CS 2600; Phyx 3010 or 3030; Geog 5110 or RLR/FW 2200; Bmet 2000; FW/Geog 3000 or Geol 3300; Sci 4300; InsT 3000; ScEd 3100, 3200, 3300, 3400, 4100, 4200, 4300, 4400, 5100, 5200, 5300, 5500, 5600; SpEd 4000.

Geology Minor. A minimum of 18 credits is required for an approved minor in Geology. Required courses are Geol 1100 or 1150, *or* Geol 3100 and 3110; and Geol 3200. Elective geology courses must be numbered 3500 or higher.

Senior Thesis. Geology majors in good academic standing may elect to complete a senior thesis. This is an endeavor which normally spans a year in its preparation and presentation. Senior thesis credits may be applied toward the elective requirements in the General Geology option. For further information, students should contact their geology adviser or the geology department head.

Geology Honors. Geology majors with a minimum GPA of 3.30 may elect to complete the requirements for the Geology Honors degree option. This is a departmental recognition which is separate from the University Honors program. For further information, students should contact their geology adviser or the geology department head.

Graduate Programs

Admission Requirements

See general admission requirements on pages 60-61. In addition, applicants must have acceptable GRE scores. Minimum scores of 40th percentile on the Verbal section and 40th percentile on the Quantitative section and a combined minimum of 1,000 are required. The advanced GRE in Geology is recommended but not required. A member of the Geology faculty must agree to serve as the major professor for the applicant prior to acceptance.

Applications will be considered throughout the year, but program entry in fall semester is preferred. Students who wish to be considered for assistantships or other financial aid must have complete applications on file no later than February 15 for entry to the program the following fall semester.

Prerequisites for Matriculation

Completion of a BS or BA in geology, biology, physics, chemistry, or engineering is required for matriculated status. Suggested prerequisite courses include: Chem 1210, 1220, 1230, 1240; Phyx 2210, 2220; Math 1210; Stat 3000; and CS 2600 or CEE 5190. Deficiencies in geology are determined based on current USU undergraduate degree requirements for either the Geology or Hydrogeology-Engineering Geology option, as appropriate. As a minimum, the following geology courses are expected: Geol 1150, 3200, 3500, 3550, 3600, 3700, 4700, and 5200. It is expected that any deficiencies will be made up before the end of the first year of study.

Degree Program

Master of Science Degree. The department offers advanced study and research leading to the MS degree in Geology or Geology-Ecology. Most geology research specialties require advanced courses selected from geology offerings. Special options are available in paleobiology and hydrogeology.

For the **paleobiology option**, advanced courses are selected from both biology and geology. Some substitution of undergraduate biology courses is allowed to meet matriculation requirements. For the **hydrogeology option**, advanced courses are selected from geology, civil and environmental engineering, soil science, and mathematics. The hydrogeology option is offered in collaboration with the Department of Civil and Environmental Engineering and the Utah Water Research Laboratory.

Specializations

Fields of specialization for graduate research include the following: Geochemistry, Hydrogeology, Igneous Petrology, Paleoecology (including invertebrate paleontology), Sedimentary Geology (including petrology, sedimentation, and stratigraphy), Structural Geology (including tectonics and geologic mapping), and Surficial Geology (including quaternary geology, glacial geology, and fluvial geomorphology).

Degree Requirements

Only the Plan A thesis option is allowed for the MS degree in Geology. The recommended distribution is 20 credits of

coursework and 10 credits of thesis to obtain the required 30 credits for the MS degree. A minimum of five 6000-level geology courses (other than Geol 6800) is recommended for the degree program. Only two grades of less than *B* (*C*- to *B*-) will be accepted as part of the required degree program as listed on the "Program of Study for Master's Degree." A 3.0 grade point average must be obtained in required coursework as listed on the Program of Study. Thesis credits will be graded *P-F* only; i.e., no letter grade will be given. Geology graduate students using department or University facilities and/or under geology faculty supervision must register for a minimum of 3 credits every semester, up to and including the semester in which the thesis is cleared by the School of Graduate Studies. Registration may not be required during the summer.

Research

There are three broad areas of research emphasis within the department: (1) sedimentary systems and paleoecology, (2) surficial geology and hydrogeology, and (3) structural geology and tectonics. Research in the broad area of sedimentary systems and paleoecology has focused on four areas: sedimentation and development of coral reefs and associated carbonate environments during Pleistocene and Holocene time, sequence stratigraphy of early Paleozoic marine sediments in the eastern Great Basin, depositional patterns and tectonics in Cenozoic time, and detrital sedimentation in Precambrian and Paleozoic time. Research activities are dominantly field oriented, with studies going on in parts of the western United States, Australia, and the Caribbean.

Surficial geology research, in the area of quaternary geology and geochronology, is concerned with the reconstruction of Pliocene-Pleistocene paleoenvironmental and paleoclimatological change. In hydrogeology, there is research activity on wellhead protection in confined to semiconfined aquifers, the relationships between stream losses and water table depths, and the identification and geochemical characterization of groundwater recharge to surface streams. Hydrogeology also interfaces with surficial geology studies, activities of the Utah Water Research Lab, the Department of Civil and Environmental Engineering, and the Department of Geography and Earth Resources.

Research in structural geology examines the mechanical and chemical evolution of fault zones; the structural and tectonic development of extensional structures in the Basin and Range province; the development of fold-and-thrust structures and rift basins in Idaho, Montana, Wyoming, and Utah; and characterization of fluid-flow properties in fractured crystalline rocks. Present studies in igneous petrology are concentrated on the volcanic rocks occurring in the northern Great Basin and adjacent Snake River Plain (northern Utah, southern Idaho, and adjacent parts of Nevada). The goal of this research is to assess relationships between tectonic and volcanic history in the transition zone between the Basin-and-Range and the Snake River Plain provinces.

Financial Assistance

Departmental financial support for incoming students consists primarily of graduate teaching assistantships, which are awarded on a competitive basis. There is often other financial support available, such as research assistantships, resulting from grants or other external funding. Students requesting financial support should apply directly to the department no later than February 15. Admission to the MS program does not guarantee financial assistance.

Additional Information

A graduate brochure outlining the research activities of faculty and graduate students may be obtained directly from the Department of Geology. For additional information and updates, check the departmental web site at http://www.usu.edu/~geoldept.

Geology Courses (Geol)

BPS 1100. Exploring the Changing Earth: Introduction to Geology. Presents basic principles of geology using a framework of plate tectonics, the central unifying theory of geology. Introduction to earth materials (minerals and various kinds of rocks) and earth processes, both internal and external. Emphasizes the continuum of interrelated events and the various cycles existing both in and on our planet. Three lectures per week (even weeks); two lectures and one lab (odd weeks). (3F,Sp,Su) ©

BPS 1150. The Dynamic Earth: Physical Geology. Physical processes, both internal and external, shaping the Earth. Igneous, metamorphic, and sedimentary environments and products. Emphasizes geology as an applied science, relying on other basic sciences as tools for interpretation and understanding. Three lectures and one two-hour lab per week. (4F)

2250. Introductory Internship/Co-op. Introductory educational work experience. (1-4F,Sp,Su) ®

2500. Geology Field Excursions. Geologic features and processes observed in the field. Prerequisite: Permission of instructor. (1-2F,Sp,Su) ®

DSC 3050. Ecology of Logan Canyon and Vicinity. Examines natural and human-caused changes in biological and physical features in the local landscape through time. Emphasizes how ecological knowledge and a sense of place can help people to better understand local environmental issues. (3F)

DSC 3100. Natural Disasters. Hazardous geologic processes affecting humans. Cause, prediction, avoidance, and frequency of natural disasters, including earthquakes, volcanic eruptions, tsunamis, landslides, floods, subsidence, meteorite impacts, and global changes. Topics discussed in the context of earth systems and cycles. Three lectures per week. Prerequisite: One breadth physical sciences course. (3F)

3110. Natural Disasters Laboratory. Laboratory exercises and field trips highlighting the relation between humans and local geologic problems. One two-hour lab per week. Prerequisite: Geol 3100 (may be taken concurrently). (1F)

DSC 3200. The Earth Through Time. Investigates dynamic nature of Earth's physical and biological processes. How these processes have shaped Earth's 4.5 billion-year history. Emphasis on learning how to interpret the story of the geologic record (rocks and landforms) and Earth's sequential physical and biological changes. Three lectures and one two-hour lab per week. Prerequisite: USU 1310 or Geol 1100 or 1150 or comparable introductory geology course. (4Sp) ©

DSC 3300. Marine Geology. Geologic evidence of the evolution of ocean basins and continental margins by sea-floor spreading. Discussion of shoreline and marine environments, as well as the processes of erosion, transport, and deposition influencing them. Three lectures per week. Prerequisite: Geol 1100 or 1150. (3F)

3500. Mineralogy and Crystallography. Introduction to crystallography, crystal chemistry, and descriptive mineralogy. Principles of optical mineralogy. Three lectures and one two-hour lab per week. Prerequisites: Chem 1210 and 1230; Geol 1150 or equivalent introductory geology course with lab. (4Sp)

3550. Sedimentation and Stratigraphy. Overview of description, classification, and interpretation of sedimentary rocks and of the principles of stratigraphic analysis and correlation of sedimentary sequences. Three lectures and one lab per week. Prerequisites: Geol 1100 or 1150; and Geol 3200; or permission of instructor. (4F)

3600. Geomorphology. Geomorphic processes, origin of land forms, and characteristics of surficial (unconsolidated) deposits. Emphasizes glacial, fluvial, and

lacustrine environments; and surficial geologic mapping. Three one-hour lectures and one three-hour lab per week. Prerequisites: Geol 1100 or 1150 or Geog 1130. (4F)

3700. Structural Geology. Examines the mechanisms, mechanics, and geometrics of deformed rocks. Basic principles of rock deformation, stress and strain, fault and fold classifications, and the mechanisms by which rocks deform. Lab presents applications and techniques important for accurately describing and representing deformed rocks in maps and cross-sections, and how to interpret and present data on rock structures. Three lectures and one three-hour lab per week. Prerequisites: Geol 1150, 3550; Phyx 2210; or permission of instructor. (4Sp)

4250. Advanced Internship/Co-op. Advanced educational work experience. (1-4F,Sp,Su) ®

4500. Igneous and Metamorphic Petrology. Origin, processes of formation, classification, and identification of igneous and metamorphic rocks. Study of igneous and metamorphic rocks in hand specimens and thin sections. Three lectures and one three-hour lab per week. Prerequisite: Geol 3500. (4F)

CI 4700. Geologic Field Methods. Collection, recording, and interpretation of geologic data. Presentation of results in written reports, graphical formats, and oral presentations. Variety of field techniques used to examine variety of geologic deposits, features, and processes. Two three-hour labs per week. Prerequisites: Geol 1150, 3550. (2F)

4900. Special Problems. Directed study of selected topics. Written report required. Prerequisite: Permission of instructor. (1-4F,Sp) ®

5200. Geology Field Camp. Integrative approach to examining geologic relationships in the field, deciphering geologic evolution of map regions, and interpreting the structure and distribution of rocks. Results presented in reports, maps, cross-sections, and graphical formats. Requires 40-45 hours of lab per week for 3.5-4.0 weeks. Prerequisites: Geol 3500, 3550, 3600, 3700, 4700. (5Su)

5410 (d6410).[1] Introduction to Clay Mineralogy. Introduction to and application of techniques, such as x-ray diffraction, differential thermal analysis, and chemical analysis, to study of clay minerals. Examination of the effects of clay mineral structures on physical and chemical properties. Three lectures and one lab per week. Prerequisite: Geol 3500 or permission of instructor. (2Sp)

5420. Metallic Mineral Deposits. Origin and occurrence of metallic mineral deposits, study of representative ore suites, and field trips to active mines. Three lectures and one lab per week. Prerequisite: Geol 4500. (4Sp)

5430. Paleontology. Survey of prominent microfossil and invertebrate taxa, including their diagnostic morphologic features, stratigraphic ranges, and environmental tolerances. Equips students with the necessary information and techniques to enable them to recognize and utilize fossils in stratigraphic and paleoenvironmental interpretation. Three lectures and one lab per week. Taught for half semester. Prerequisite: Geol 3200. (2Sp)

CI 5440 (d6440). Paleoecology. Interrelationships between various organisms and between organisms and their environment. Provides field, laboratory, and quantitative techniques for the interpretation of ancient environments and the analysis of past biotic interrelationships. Three lectures and one lab per week. Taught for half semester. Prerequisites: Geol 3200, 5430. (2Sp)

CI 5450 (d6450). Glacial Geology. Introduction to glaciology, glacial erosion and deposition, isostatic and eustatic effects, North American glacial stratigraphy, and glacial geologic research techniques. Three lectures per week. Prerequisite: Geol 3600. (3Sp)

5460 (d6460). Interpretation of Sedimentary Rocks I. Detailed interpretation of sedimentary rocks, based on petrography and sedimentary characteristics. Source terranes, tectonic settings, depositional environments, and diagenetic changes during burial. Three lectures and two labs per week. Taught for half semester. Prerequisites: Geol 3500 and 3550, or permission of instructor. (3F)

5470 (d6470). Interpretation of Sedimentary Rocks II. Application of field observations, hand-sample, thin-section, and x-ray diffraction analyses to the interpretation of chemical sedimentary rocks. Emphasizes determination of depositional environment and evaluation of diagenetic changes. Three lectures and one lab per week. Taught for half semester. Prerequisites: Geol 3500 and 3550, or permission of instructor. (2F)

QI 5510. Groundwater Geology. Provides graduate students and senior undergraduates with understanding of fundamental principles of groundwater geology and hydrology, and helps prepare them for careers in hydrogeology or environmental geology. Three lectures per week. Prerequisites: Geol 1150 and Math 1210 or permission of instructor; Geol 3600 recommended. (3F)

CI 5520 (d6520). Hydrogeologic Field Methods. Methods of collection and analysis of field data for groundwater studies. Three lectures per week. Prerequisite: Geol 5510 or permission of instructor. (3Sp)

QI 5530. Exploration Geophysics and Petroleum Exploration. Applications of gravity, magnetics, electrical/electromagnetic methods, seismic reflection and refraction, borehole logging, and organic geochemistry in exploration for petroleum, groundwater, and ore bodies, and in amelioration of pollution. Three lectures and one two-hour lab per week. Prerequisites: Geol 3550, 3700; Phyx 2220; or permission of instructor. (4Sp)

QI 5540 (d6540). Quantitative Methods in Geology. Application of various quantitative methodologies to geologic problems. Two lectures and one lab per week. (3Sp)

5600. Geochemistry. Application of thermodynamics, solution chemistry, phase diagrams, and both radioactive and stable isotopes to the understanding of earth processes. Three lectures per week. Prerequisite: Geol 3500. (3F)

5610 (d6610). Tectonic Evolution of North America. Survey of tectonic styles and processes along plate margins, using the tectonic evolution of western North America as the prime example. Two lectures and one lab per week. Prerequisite: Geol 3700. (3F)

QI 5620 (d6620). Global Geophysics. Application of physics to understanding geologic processes, the earth's interior, and the theory of plate tectonics. Two lectures and one two-hour lab per week. Prerequisites: Geol 3700, Phyx 2210, 2220. (3Sp)

5630. Photogeology. Interpretation of geologic features on aerial photographs. Two two-hour labs per week. Prerequisites: Geol 3600, 3700. (2F)

CI 5640 (d6640). Quaternary Climate Change. Analysis of causes and effects of climate change on time scales of decades to hundreds of thousands of years. Methods used to reconstruct past climates and to date geologic materials. Three lectures per week. Prerequisite: Geol 1150 or permission of instructor. (3Sp)

5650. Senior Thesis. Prerequisite: Permission of instructor. (1-4F,Sp) ®

5900. Topics for Teachers. Special topics in geology for elementary and secondary science teachers to provide an understanding of the geology of Utah and the Western United States. Emphasis on field and lab activities. Prerequisite: Introductory geology course or permission of instructor. (1-4F,Sp,Su) ®

6250. Mechanics and Processes in Earth Sciences. Fundamentals of solid and fluid mechanics with applications to the earth sciences. Applications to rock deformation, fluid flow, glacier movement, and slope stability. Designed for graduate students in earth sciences and engineering. Two lectures, one lab per week. Prerequisites: Geol 3700, Math 1210; or permission of instructor. (3F)

6410 (d5410). Introduction to Clay Mineralogy. Introduction to and application of techniques, such as x-ray diffraction, differential thermal analysis, and chemical analysis, to study of clay minerals. Examination of the effects of clay mineral structures on physical and chemical properties. Three lectures and one lab per week. Prerequisite: Geol 3500 or permission of instructor. (2Sp)

6440 (d5440). Paleoecology. Interrelationships between various organisms and between organisms and their environment. Provides field, laboratory, and quantitative techniques for the interpretation of ancient environments and the analysis of past biotic interrelationships. Three lectures and one lab per week. Taught for half semester. Prerequisites: Geol 3200, 5430. (2Sp)

6450 (d5450). Glacial Geology. Introduction to glaciology, glacial erosion and deposition, isostatic and eustatic effects, North American glacial stratigraphy, and glacial geologic research techniques. Three lectures per week. Prerequisite: Geol 3600. (3Sp)

6460 (d5460). Interpretation of Sedimentary Rocks I. Detailed interpretation of sedimentary rocks, based on petrography and sedimentary characteristics. Source terranes, tectonic settings, depositional environments, and diagenetic changes during burial. Three lectures and two labs per week. Taught for half semester. Prerequisites: Geol 3500 and 3550, or permission of instructor. (3F)

6470 (d5470). Interpretation of Sedimentary Rocks II. Application of field observations, hand-sample, thin-section, and x-ray diffraction analyses to the interpretation of chemical sedimentary rocks. Emphasizes determination of depositional environment and evaluation of diagenetic changes. Three lectures and one lab per week. Taught for half semester. Prerequisites: Geol 3500 and 3550, or permission of instructor. (2F)

6520 (d5520). Hydrogeologic Field Methods. Methods of collection and analysis of field data for groundwater studies. Three lectures per week. Prerequisite: Geol 5510 or permission of instructor. (3Sp)

6540 (d5540). Quantitative Methods in Geology. Application of various quantitative methodologies to geologic problems. Two lectures and one lab per week. (3Sp)

6610 (d5610). Tectonic Evolution of North America. Survey of tectonic styles and processes along plate margins, using the tectonic evolution of western North America as the prime example. Two lectures and one lab per week. Prerequisite: Geol 3700. (3F)

6620 (d5620). Global Geophysics. Application of physics to understanding geologic processes, the earth's interior, and the theory of plate tectonics. Two lectures and one two-hour lab per week. Prerequisites: Geol 3700, Phyx 2210, 2220. (3Sp)

6640 (d5640). Quaternary Climate Change. Analysis of causes and effects of climate change on time scales of decades to hundreds of thousands of years. Methods used to reconstruct past climates and to date geologic materials. Three lectures per week. Prerequisite: Geol 1150 or permission of instructor. (3Sp)

6800. Seminar. (1-4) ®

6970. Thesis. (1-8F,Sp) ®

6990. Continuing Graduate Advisement. (1-3F,Sp) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of

Health, Physical Education and Recreation

College of Education

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Professors *Lanny J. Nalder*, ACSM Board certified, corporate wellness, exercise physiology, preventive and post-coronary exercise rehabilitation; *Robert E. Sorenson*, health and wellness, stress management; **Associate Professors** *Hilda Fronske*, motor learning; *Donna L. Gordon*, movement therapy, stress management; *Dennis A. Nelson*, family recreation, multicultural education, recreation administration; *Rolayne Wilson*, elementary physical education; **Nontenure Assistant Professors** *Julianne Abendroth-Smith*, anatomical kinesiology, biomechanics; *Julie A. Gast*, community health, multicultural health issues, women's health; *John M. Kras*, administration, history, philosophy and sociology of sport; *Monica F. Lounsbery*, assessment, pedagogy, school/university collaborative initiatives; *Frank E. White, Jr.*, outdoor recreation, therapeutic recreation; **Senior Lecturer** *Peter J. Mathesius*, conditioning, sport skills, and teaching methods; **Lecturers** *Raymond Corn*, conditioning; *Delphine C. Rossi*, school health education

Degrees offered: Bachelor of Science (BS) in Health Education Specialist; BS in Parks and Recreation; BS in Physical Education; Master of Science (MS) and Master of Education (MEd) in Health, Physical Education and Recreation

Undergraduate emphases: *BS in Health Education Specialist*–School Health and Community Health; *BS in Physical Education*–Exercise Science, Pre-Physical Therapy, and Teaching; **Graduate specializations:** *MS*–Corporate Wellness, Exercise Science, and Health Education

Undergraduate Programs

Objectives

Undergraduate Programs of Study. The Health, Physical Education and Recreation (HPER) Department offers undergraduate programs of study designed to prepare USU students for successful careers in one of three areas: Health Education Specialist, Physical Education, or Parks and Recreation. Preparation is accomplished through well-rounded, rigorous course requirements.

Activity Courses. USU students are served by an extensive elective activity course program. The number and diversity of courses encourages students to increase their lifetime participation skills and enjoy opportunities for creativity and expression. Students may also achieve and maintain a high level of personal fitness and adopt a preventive medicine life-style conducive to health and well-being.

Recreational and Intramural Activities. The intramural program is planned and conducted to meet the needs of all students regardless of skill or ability. The major objectives are to offer a wide variety of sports experiences, to encourage lifetime sports participation, to develop habits of fair play, and to provide leadership experiences. The intramural concept not only embraces the traditional highly-organized program with teams, leagues, and tournaments, but also voluntary free play activities where opportunities are provided for physical recreation for all segments of the University community.

Departmental Admission Requirements

Health Education Specialist Majors and Minor. New freshmen, transfer students, and students from other USU majors who have at least a 2.75 total GPA qualify to enter the Health Education Specialist pre-major. Student must formally apply to the School Health option and minor. Pre-major/minor coursework must be completed before application to the major or minor. For application materials and deadlines, contact the HPER Department Main Office (PE 122). No formal application is required for the Community Health option, however, all pre-major coursework must be completed before students will be considered Health Education Specialist majors.

Physical Education Majors and Minor. New freshmen, transfer students, and other USU majors who have a 2.75 total GPA qualify to enter the Physical Education pre-major. After the completion of the 31 credit pre-major program, students may apply to the Physical Education major. Enrollment in the Physical Education program is limited to ensure a quality program. Application materials may be obtained from the HPER Department Main Office (PE 122) and must be returned by the end of the sixth week of the semester. The application process includes completion of the pre-major courses, a current USU transcript, a one-page statement on the student's physical education philosophy, and a current resume. The admissions committee considers grades, trends in performance, extracurricular activities and the candidate's philosophy of

physical education. Where there are minimum cutoff levels on specific criterion, the committee reviews all factors in assessing a candidate's potential to succeed in the physical education program as well as in the public sector.

The following pre-major courses are required for all Physical Education majors: Biol 2000, 2010; Math 1050 or higher; Engl 1010 or higher; a Breadth Physical Sciences University Studies course; and an American Institutions University Studies course. To qualify for the *Exercise Science* option, the student must also complete PEP 2000 and 8 credits from the following: Biol 1010, 1020; Phyx 1100 or Chem 1120; Chem 1210, 1220. Students applying for the *Pre-Physical Therapy* option must have a 3.0 total GPA; complete PEP 2020; Psy 1010; and take 5 credits from the following: Math 1060; Chem 1210, 1220; Phyx 2110; Biol 1010, 1210, 1220. The *Teaching* option requires PEP 2000, 2100, 2200, 2300, 2400, 2500; and Psy 1010.

A formal application and 2.75 total GPA are also required for the Physical Education/Coaching minor. To qualify for the Physical Education/Coaching minor, students must complete Biol 2000, 2010; Math 1050 or higher; Engl 1010 or higher; Psy 1010; and 3 of the following: PEP 2100, 2200, 2300, 2400, 2500.

Parks and Recreation Major and Minor. New freshmen, transfer students and students from other USU majors who have at least a 2.5 total GPA qualify to enter the Parks and Recreation major or minor.

Course Requirements

Health Education Specialist Major. All students in the Health Education Specialist major must complete the following 30 credit hour core: Biol 2000, 2010; NFS 1020; HEP 2000, 2500, 3000, 3200, 4000, 4200, 5000. In addition, a 2.75 total GPA is required for graduation.

Community Health Option. The Community Health option offers a program of study leading to a Bachelor of Science degree as a Health Education Specialist. The option requires a total of 72 credits. Students must complete the Health Education Specialist 30-credit core, and the Community Health Education 27-credit core which consists of the following: HEP 4100, 4600, 5200; InsT 5400; MHR 3110; Psy 2800; PubH 5010, 5020; FHD 3110; NFS 4480. Students must complete 15 credits of elective courses, taking at least one course from the following three areas: *Human Nature*: Anth 3110, 4130, 5140; Psy 1100, 1210, 4240; FHD 1500, 3530; Soc 2500, 3010, 3330; SW 2500; *Content and Methods in Education*: BIS 1400, 1550; Comm 1110, 1200, 3010; HEP 3100, 3400, 3500, 4400, 4500, 5700; NFS 2020; PEP 4100; Soc 3750; Spch 1050; *Organizational Dynamics in the Family and Community*: Comm 1300; PubH 3120, 3310; Spch 2600, 3250; FHD 3120; PolS 3810; MHR 3820; SW 2400, 3750.

School Health Option. The School Health option offers a program of study leading to a Bachelor of Science degree as a Health Education Specialist, and is an approved teaching major through the Department of Secondary Education. The emphasis requires a total of 77 credits. It is also necessary for students to complete an approved teaching minor (credits will vary). Students must complete the Health Education Specialist 30 credit core, the Secondary Education 35 credit core, and the School Health Education 12 credit core. The School Health Education core includes: FHD 1500; HEP 3100, 4400, 4500.

School Health Minor. The School Health minor requires a total of 20 credit hours. Required courses include: Biol 2000 or 2010, HEP 2000, 2500, 3000, 3100, 4400, 4500.

Parks and Recreation Major. The HPER Department offers a program of study leading to a Bachelor of Science Degree in Parks and Recreation. This program prepares students to become professionals in the areas of public, private, commercial, voluntary, and special service settings of parks and recreation. Graduates of the program will be capable of directing, planning, designing, managing, and administering parks and recreation programs. The Bachelor of Science degree requires 50 credits. The following courses are required: PRP 1000, 1500, 2250, 2500, 3000, 3100, 3500, 3750, 4000, 4300, 4400, 4500, 4700, 4750, 5000; In addition, the student must choose 4 credits from the following courses: LAEP 1030; RR 4100, 4200, 4300; PE 1000, 1220, 1240, 1250, 1400, 1500, 2050; HEP 2000, 3400; PRP 4200; FR 4550. Students must also complete an outside minor, which must be approved by the HPER Department. A 2.5 total GPA is required for graduation.

Parks and Recreation Minor. A minor in Parks and Recreation consists of a minimum of 17 credits of coursework selected from the core courses below. The required courses in this minor include PRP 1000, 1500, 2500, 3000, and 3500. In addition, students must select 5 credits from the following courses: PRP 3100, 4000, 4250, 4400, 4500; NR 2340; FR 4550.

Physical Education Major: Exercise Science Option. The Physical Education Exercise Science option consists of 52 credits of coursework leading to a Bachelor of Science Degree in Physical Education. The following courses are required: PEP 2000, 3100, 4100, 4200, 4400; HEP 2500; PE 3000. (The prerequisites for these courses include: Biol 2000, 2010; Math 1050.) No fewer than 5 credits must be taken from the following: HEP 2000, 3200, 3400; PEP 4000, 5070, 5430. A minimum of 4 credits (including lab) must be taken from the following: Biol 1010, 1020, 1210, 1220, 1230, 1240, 2200, 5190. At least 4 credits (including lab) must be taken from the following: Chem 1010, 1110, 1120, 1130, 1210, 1220, 1230, 1240. No fewer than 3 credits must be selected from the following: Phyx 1100, 1200, 2110, 2120; Psy 1010, 2100, 2800, 3210; NFS 1020. Three (3) different Physical Education Activity Classes must be taken to complete the required coursework. A 2.75 total GPA is required for graduation.

Physical Education Major: Pre-Physical Therapy Option. The Physical Education Pre-Physical Therapy option consists of 54 credits of coursework leading to a Bachelor of Science Degree in Physical Education. *Please note that it is the student's responsibility to check with the individual physical therapy schools concerning courses required for admission. The HPER Department will not guarantee admission into physical therapy school.* The following courses are required: PEP 2020, 3100, 4100, 4200, 4250, 4400; PE 3000; Phyx 2110, 2120. (The prerequisites for these courses include: Biol 2000, 2010; Math 1050; Math 1100 or 1210; Phyx 2110.) A minimum of 5 credits (including lab) must be taken from the following courses: Biol 1010, 1020, 1210, 1220, 1230, 1240, 2200, 5190. (The prerequisites for these courses include: Biol 1210, 1220, 2200; Math 1050; Chem 3700.) A minimum of 10 credits (including lab) must be taken from the following courses: Chem 1210, 1220, 1230, 1240. (The prerequisites for these courses include: Math 1050; Chem 1210, 1230.) A minimum of 6 credits must be taken from the following courses: Math 1100, 1210; Stat 1040; Psy 2800. (The prerequisites for these courses include: Math 1050 for Math 1100; Math 1050 and 1060 for Math 1210; Math 0990, Stat

1040.) A minimum of 3 credits must be taken from the following courses: Psy 1210, 2100, 3210. (The prerequisite for these courses is Psy 1010.) A 3.0 total GPA is required to graduate.

Physical Education Major: Teaching Option. The Physical Education Teaching option requires 89 credits of coursework and leads to a Bachelor of Science Degree in Physical Education with a teaching certificate. The following courses are required: PEP 2000, 2100, 2200, 2300, 2400, 2500, 3050, 3100, 3200, 3350, 3400, 3500, 4000, 4100, 4200, 4350, 4400. (The prerequisites for these courses include: Biol 2000, 2010; Math 1050; HEP 2000; PE 3000.) Students must also complete PEP 4500 and two courses from the following: PEP 4600, 4700, 4800. In order to obtain the teaching certificate, the following courses must be completed: PEP 3300, 4300, 4900, 5500, 5600. A 2.75 total GPA is required for graduation.

Physical Education Coaching Minor. The Physical Education Coaching minor requires 23 credits of coursework. The following courses are required: PEP 3100, 3200, 4000, 4100, 4350, 4400. (The prerequisites for these courses include: Biol 2000, 2010; Math 1050; HEP 2000; PE 3000; PEP 2100, 2200, 2300, 2400, 2500.) Students must complete three of the following courses: PEP 2100, 2200, 2300, 2400, 2500. Students must complete two of the following courses: PEP 3350, 3400, 3500. A minimum of 3 credits must be taken from the following: PEP 2050, 4500, 4600, 4700, 4800. In order to obtain a teaching certificate, the following additional coursework is required: PEP 3300, 4300, 4900, 5500, 5600. Courses within the Teacher Preparation Framework are also required.

Elementary Physical Education Support Minor (for Elementary Education majors only). This minor requires 16 credits of coursework. The following courses are required: PEP 3200, 3600, 3650; HEP 2000. Two credits must be selected from the following courses: PEP 2100, 2200, 2300, 2400. The remaining credits must be taken from the following courses: PEP 2500; HEP 2500; PE 1500, 3000.

Additional Information

Updated information concerning undergraduate courses and major or minor requirements can be obtained from the HPER Department, or check the departmental home page at http://www.usu.edu/hper.

Financial Support

The College of Education distributes scholarship applications beginning in January of each academic year. For information on those scholarships awarded by the HPER Department, please refer to the Scholarship Listing on pages 27-28 of this catalog.

Graduate Programs

Please refer to the general admission requirements on pages 60-61 of this catalog. In addition, the letters of recommendation must be written by professionals in health or physical education who know the applicant and his/her work well. Students with fewer than 12 credits of undergraduate health or physical education coursework must make up any deficiencies before being granted matriculated status. Basic competencies that have not been acquired through courses or experience may be obtained by completing prerequisite undergraduate courses without credit. Other nongraduate credit courses may be required by the admissions committee. Students with weak oral or written English skills will be required to take remedial work or complete undergraduate or Intensive English classes.

Degree Programs

Master of Science. The MS is available for students who plan to teach, provide community leadership, or do further graduate or research study.

Master of Education. The MEd is designed for students desiring to improve teaching competencies.

Specializations

MS students may select an area of emphasis for research and study from the following specializations: Corporate Wellness, Exercise Science, and Health Education.

Course Requirements

Core Courses

MS candidates specializing in ***Corporate Wellness*** must complete the following courses: Educ 6570; HEP 6400, 6800; MHR 6550; PEP 6290, 6400, 6450, 6500, 6540, 6800, 6810; and Psy 6450.

MS candidates specializing in ***Exercise Science*** must complete PEP 6400, 6800, 6810, 6970; Educ 6570. Eleven credits must be selected from the following: PEP 6050, 6070, 6420, 6430, 6450, 6540, 6830; HEP 6100, 6400; Educ 6600.

MS candidates specializing in ***Health Education*** must complete Educ 6010, 6570, 6600; HEP 6100, 6600, 6800, 6970. Students must also complete 6 credits from the following: Anth 5140; FHD 6020, 6060; HEnv 6210; HEP 6300, 6400, 6700, 6900, 6950; InsT 5230, 6350; MHR 6370; NFS 6200, 6210; PEP 6290, 6400, 6540; Psy 6470, 7700; PubH 5010, 5020, 5310; Soc 6460. Other courses may be selected on the basis of a student's need and interests, subject to the approval of the student's committee.

MEd candidates must complete Educ 6410, 6550, 6710; PEP 6050, 6070, 6400, 6420, 6430, 6690, 6800, 6830, 6960.

Research

Research areas include exercise science, corporate wellness, sport psychology, sport in society, biomechanics, and pedagogy.

Financial Assistance

Teaching and research assistantships are available through the HPER Department and are awarded on a competitive basis. Application for the assistantships must be made by March 15 to the department head. A formal application for admission must be submitted to the School of Graduate Studies at the same time as the application for an assistantship. A recipient of a graduate assistantship is usually eligible for a waiver for the out-of-state portion of his/her tuition.

Additional Information

Additional and/or updated information about graduate courses and programs may be obtained from the HPER Department, or check the departmental home page at http://www.usu.edu/hper.

Health, Physical Education and Recreation Courses

Professional Courses in Health Education (HEP)

2000. First Aid and Emergency Care. Provides instruction and practical experience for the development of first aid knowledge, skills, and personal judgment. Focuses on recognizing emergencies, activating EMS, and providing direct care. (2F,Sp,Su)

2300. Cardiopulmonary Resuscitation. Techniques and skills of adult, child, and infant airway management and cardiopulmonary resuscitation for the lay person (one rescuer). Taught according to current standards. (1F,Sp,Su)

2500. Health and Wellness. Designed to enable students to enhance personal wellness by gaining understanding about the social, physical, spiritual, and emotional dimensions of health, and by applying different strategies for improving personal health behaviors. (2F,Sp,Su)

3000. Drugs and Human Behavior. Students evaluate the historical and modern use, misuse, and abuse of drugs in relation to current concepts of physical, social, and emotional wellness. Special emphasis on educational and community strategies for prevention of drug-related problems. (3F)

3100. School Health Programs. Essentials of the existing paradigm of Comprehensive School Health Programs and their development in relation to current child health status. Assessment, planning, implementation, and evaluation. (3F)

3200. Consumer Health. Focuses on helping students become discriminating consumers of health information, health products, and health services. (3F)

3300. Clinical Experience I. Clinical experience in school health education. Prerequisite: Acceptance into School Health major or minor. (1F,Sp)

3400. Stress Management. Concepts and principles of personal stress management, with special emphasis on effective stress management coping strategies, maximizing positive stress outcomes, and minimizing negative stress effects, to aid in obtaining and maintaining a balanced health homeostatic condition. (3F)

3500. Elementary School Health Education. Explores child health status and the vital roles that the school/elementary teacher plays in enabling children to acquire healthful lifestyle behaviors while increasing their potential for academic success. (2F,Sp)

CI 4000. Introduction to Community Health. Introduction to agencies, facilities, and programs playing a role in protection and promotion of health in the community. Special emphasis on competencies necessary for the health educator to function in a variety of community settings. Prerequisite: HEP 2500. (3F)

4100. Foundations of Community Health. Professional preparation course for health education majors. Primary emphasis on ethical issues, behavioral and sociological theories used in the profession, philosophical issues, technology, and health education methodologies. Prerequisite: HEP 2500. (3F)

QI 4200. Planning and Evaluation for Health Education. Provides indepth study of planning, implementation, and evaluation of school and community health education programs. Students obtain hands-on experience planning a health education program. Prerequisites: HEP 4000; Math 1030 or Stat 1040. (3Sp)

4250. Advanced Cooperative Work Experience. Professional level cooperative education work experience as student advances toward completion of the program. Prerequisite: Consent of instructor. (1-15F,Sp,Su) ®

4300. Clinical Experience II. Clinical experience in school health education. Prerequisite: Acceptance into School Health major or minor. (1F,Sp)

4400. Creative Methods in Teaching Health Education. Planning, designing, and evaluating comprehensive school health education curricula and instruction for secondary school students, utilizing various creative instructional strategies and materials. Participation in peer teaching experiences. Prerequisite: Junior standing and acceptance into School Health Education. (3F,Sp)

4500. Sexuality Education Within the Schools. Emphasizes broad understanding of human sexuality, with specific focus on adolescent sexuality/behavior, age and topic appropriate instruction, state law, and effective curriculum/strategies for human sexuality education within the secondary schools. (3Sp)

4600. Field Work in Health Education. Supervised student participation in school or community health programs or directed projects. Prerequisites: HEP 4000, 4100, and consent of instructor. (1-9F,Sp,Su) ®

4700H. Honors Senior Thesis. Culminating experience within the department for honors students. Student works closely with faculty mentor in an extensive project in the student's area of interest. (1-6F,Sp,Su)

CI 5000. Race, Class, and Gender Issues in Health. Focuses on how multicultural issues affect health status and health choices. Special emphasis on how race, ethnicity, socioeconomic status, and gender impact health status and access to health care. Prerequisite: Junior standing. (3Sp)

5200. International Health. Explores meaning of "health" through the lens of different cultures. Provides an international comparison of health status, including morbidity and mortality data. Evaluates different programs, policies, and strategies for addressing international health problems. Prerequisite: Junior standing. (3Sp)

5500. Student Teaching Seminar. Weekly seminar dealing with the professional practice of school health education. Prerequisite: HEP 4400. (2F,Sp)

5600. Student Teaching. Practical experience teaching health in the public school system. Prerequisite: HEP 4400. (8F,Sp)

5700. Special Topics in Health. In-depth review and discussion of special topics in health. (1-6F,Sp,Su) ®

5900. Independent Study. Prerequisite: Consent of instructor. (1-3F,Sp,Su) ®

5950. Independent Research. Prerequisite: Consent of instructor. (1-3F,Sp,Su) ®

6100. Current Trends in Health Promotion. Focuses on trends and issues in the promotion of health behaviors in a variety of settings. Analyzes and challenges prevailing assumptions and philosophies in relation to health promotion. (3Sp)

6250. Graduate Cooperative Work Experience. Professional level of education work experience in a cooperative education position for graduate students. Prerequisite: Consent of instructor. (1-15F,Sp,Su)

6300. Stress Management. Explores concepts and principles of personal stress management, with special emphasis on effective stress management coping strategies, maximizing positive stress outcomes, and minimizing negative stress effects, thus aiding in obtaining and maintaining a balanced, healthy homeostatic condition. (3)

6400. Worksite Stress Management. Concepts and principles of worksite stress management, with special emphasis on effective stress management coping strategies aiding in building a self-reliant workforce. (3Sp)

6600. Field Work in Health Education. Supervised student participation in school or community health projects or directed projects. Prerequisite: Consent of instructor. (3F,Sp,Su) ®

6700. Special Topics in Health. In-depth review and discussion of special topics in health. (1-6F,Sp,Su) ®

6800. Seminar in Health Behavior. Explores current theoretical perspectives in relation to behaviors. Students critically examine theories commonly used in health education. Focuses on practical application of thoery in health promotion programs. (3F)

6900. Independent Study. Prerequisite: Consent of instructor. (1-3F,Sp,Su) ®

6950. Independent Research. Prerequisite: Consent of instructor. (1-3F,Sp,Su) ®

6970. Thesis. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

Professional Courses in Physical Education (PEP)

2000. Introduction and History of Physical Education. Acquaints P.E. students with four areas of physical education, including: the department, with respect to the University and the College of Education; the history of physical education; the effects of sociology on physical education; and future employment opportunities in the fields of physical education. (2F,Sp)

2020. Introduction to Physical Therapy. Introduces prephysical therapy students to the discipline of physical therapy and familiarizes them with its associated spectrum of opportunities and responsibilities. (2F)

2050. Sports Officiating. Knowledge of the rules and mechanics of officiating football, basketball, volleyball, softball, and soccer. (1F)

2100. Skills 1 (Swimming, Volleyball, Football). Provides physical education majors and minors with the knowledge, skills, practice, and understanding of swimming, volleyball, and football needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (1F,Sp)

2200. Skills 2 (Lifetime Activities). Provides physical education majors and minors with the knowledge, skills, practice, and understanding of lifetime activities needed for successful participation. Exposes students to a variety of teaching methods for these activities. (1F,Sp)

2300. Skills 3 (Softball, Basketball, Soccer). Provides physical education majors and minors with the knowledge, skills, practice, and understanding of softball, basketball, and soccer needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (1F,Sp)

2400. Skills 4 (Tennis, Badminton, Track and Field). Provides physical education majors and minors with the knowledge, skills, practice, and understanding of tennis, badminton, and track and field needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (1F,Sp)

2500. Rhythms and Movement. Focuses on fundamental motor skills, mixers, aerobic, line, folk, ballroom, and square dance. Provides opportunities to practice rhythms and movement, as well as opportunities to practice teaching. Designed for physical education majors and minors. (1F,Sp)

3050. Physical Education in the Elementary School. Prepares students to teach elementary physical education. Focuses on developmentally appropriate activities, locomotor and manipulative skills, fitness, games, rhythms, motor learning, and lesson planning. Students will teach physical education lessons in the elementary school. (2F,Sp)

3100. Athletic Injuries. Care and prevention of common athletic injuries and standard taping techniques. Emphasizes recognition, first aid, and referral for these injuries. Taping techniques taught in a lab setting. (3F,Sp)

CI 3200. Motor Learning and Skill Analysis. Exploration of materials, methods, and mechanisms of learning and performing motor skills. A variety of sport skills taught in lab, using cues, demonstrations, feedback, and game-like drills. Performance of skill analysis for variety of sport skills. (3F,Sp)

3300. Clinical Experience I. Public school clinical experience in physical education. Prerequisite: Admission into Teacher Education program. (1F,Sp)

3350. Methods of Individual and Dual Sports. Prepares students by providing strategies and materials for implementing a quality physical education program in individual and dual sports. Discussion of lesson and unit planning, as well as student evaluation. Prerequisites: PEP 2200, 2400. (1F,Sp)

3400. Methods of Team Sports. Prepares students by providing strategies and materials for implementing quality physical education program in team sports. Discussion of lesson and unit planning, as well as student evaluation. Prerequisites: PEP 2100, 2300. (1F,Sp)

3500. Methods of Fitness Education. Emphasizes classroom components for teaching lecture/activity fitness course. Students peer teach in a lecture environment. Discussion of strategies and materials for planning and implementing a quality physical education academic fitness course. Includes lecture planning, presentation, unit preparation, and evaluation. Prerequisites: PE 3000, PEP 3350, 3400. (1F,Sp)

3600. Elementary Physical Education Practicum. Prepares teachers to teach elementary physical education as a support minor. Prerequisite: PEP 3050. (3Sp)

3650. Movement Exploration for Elementary Teachers. Covers creative movement, international folk dance, and square dance. Experiences range from classroom management and curriculum development to large open-space activities and performance. Includes art and sound activities. (2F)

4000. Mental Aspects of Sports Performance. Provides current knowledge of sport psychology. Applies this knowledge to teaching sports and coaching in public schools. (3F)

4100. Exercise Physiology and Principles of Conditioning. Designed to expose students to theory and application of exercise physiology and principles of training and conditioning. Laboratory experience provides hands-on practicum for concepts taught in the classroom. Prerequisites: Biol 2000, 2010, Math 1050. (4F,Sp,Su) ®

4150. Advanced Care and Prevention of Athletic Injuries. Final preparation and competency demonstration of knowledge and skills prior to taking the national certification exam for the Athletic Training credential. Prerequisites: PEP 3100, instructor approval, and NATABOC certification eligibility. (3F,Sp)

QI 4200. Biomechanics. Understanding and application of human anatomical kinesiology and biomechanical principles fundamental to efficient human movement. In required concurrent one-hour lab, students obtain hands-on application of principles of anatomical kinesiology and biomechanics. Prerequisites: Biol 2000, 2010; Math 1050 or equivalent. (4F,Sp) ®

4250. Advanced Cooperative Work Experience. Cooperative education work experience offers student opportunity to work in related field work of the major. Prerequisite: Instructor approval. (1-10F,Sp,Su) ®

4300. Clinical Experience II. Public school clinical experience in physical education. Prerequisite: Admission into Teacher Education program. (1F,Sp)

4350. Administration of Physical Education. Designed to help students understand objectives of physical education and sport, and incorporate them into a philosophy to assist in developing quality programs at the secondary level. Covers all aspects of physical education and sport administration including, but not limited to, budget, personnel, facilities management, programs, and activities. (2F,Sp)

QI 4400. Evaluation in Physical Education. Focuses on the nature and use of a variety of tests in physical education. Practical application, interpretation, and use of test results are stressed. (3F,Sp)

4500. Methods of Coaching. Addresses issues associated with secondary coaching,

including budgets, fund raising, discipline policy, parents, booster clubs, equipment, liability, team selection, etc. (1F,Sp)

4600. Methods of Coaching Football and Soccer. Outlines the methods, strategies, and techniques for coaching scholastic football and soccer. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (1Sp)

4700. Methods of Coaching Volleyball, Track and Field. Outlines the methods, strategies, and techniques for coaching scholastic volleyball, as well as track and field. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (1F,Sp)

4800. Methods of Coaching Basketball, Baseball, and Softball. Outlines methods, strategies, and techniques of coaching scholastic basketball, baseball, and softball. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (1F)

4850. Methods of Teaching and Coaching Women's Gymnastics. Instructs students in required coaching methods for women's gymnastics from the beginning to advanced levels. Also includes section on judging. (3F,Sp)

CI 4900. Methods of Physical Education. Designed to prepare physical education majors and minors to teach physical education in the schools. Emphasizes planning, teaching, strategies, and methods. Admission to the Teacher Education program is required. Must be taken concurrently with either PEP 3300 or 4300. Prerequisites: Two courses selected from PEP 3350, 3400, and 3500. (3F,Sp)

4950H. Honors Senior Thesis. Culminating experience within the department for honors students. Student works closely with faculty mentor in an extensive project in the student's area of interest. (1-6F,Sp)

5050 (d6050).[1] Psychological Aspects of Sports Performance. Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, and personality and sports performance. (3Sp)

5070. Sport Sociology. Develops understanding of the social significance of sport. Applies the sociological perspective to a variety of contemporary issues, enabling students to better understand how sport affects and reflects American culture. (3Sp)

CI 5430. The History and Philosophy of Physical Education. Designed to familiarize physical education majors (or nonmajors) with history of physical education and sport, as well as philosophical influences which have contributed to development of contemporary physical education and sport. Considers historical development of yesterday's pastimes into today's complex, institutionalized forms of sport and physical education. (3F)

5500. Student Teaching Seminar. Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction. Prerequisites: PEP 4900, completion of Level I and II field experiences. (2F,Sp)

5560. Practicum in Improving School System Programs. In-service seminar for experienced teachers, emphasizing improvement in instruction. (1-4F,Sp,Su) ®

5600. Student Teaching in Secondary Schools. A 10-week culminating experience in which students assume full-time teaching responsibilities under the direction of cooperating teachers in physical education. Prerequisites: PEP 4900, completion of Level I and Level II field experiences. (8F,Sp)

5900. Independent Study. Provides opportunity for undergraduate or graduate students to participate in independent inquiry under guidance of a professor. (1-3F,Sp,Su)

6000. Administration of Athletics. Prepares students to organize and administer interscholastic and intercollegiate sports at the public school or university level. Consideration is given to both the challenges and standards associated with such programs. (3Sp)

6010. Leadership in Health, Physical Education, and Recreation. Group approach to improvement and innovation in leadership and supervisory skills. (3Sp)

6050 (d5050). Psychological Aspects of Sports Performance. Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, and personality and sports performance. (3Sp)

6070. Sport in Society. Introduces students to complex role and social significance of sport in contemporary society. Familiarizes students with aims, scope, and potential contributions of sport in society. (3Sp)

6250. Graduate Cooperative Work Experience. Professional level of educational work experience in a cooperative education position for graduate students. (1-10F,Sp,Su) ®

6290. Corporate Wellness Marketing. Reviews history of corporate fitness in America, as well as common organizational and management practices. Emphasizes marketing practices promoting individual and business involvement. (3Sp)

6400. Exercise in Health, Fitness, and Sport. Emphasizes physiological and health benefits of exercise. Discusses role of exercise in disease prevention, along with medications given to treat illness and disease. (4F)

6420. Curriculum in Physical Educaiton. Curriculum development studied in terms of student needs in relation to present-day society. Includes current practices and trends in the area of curriculum. (3F)

6430. History and Philosophy of Physical Education and Sport. History of physical education; philosophical influences which have contributed to contemporary physical education; and methods of educational instruction using the primary philosophical positions. (3F)

6450. Fitness Assessment and Exercise Testing. Exposure to fitness assessment in clinical cardiac settings, as well as in corporate wellness settings. Exercise testing and interpretations, using different testing protocols in emphasized variant electrocardiograms, studied as part of the disease process. Prerequisite: PEP 6400. (3Sp)

6500. Practicum in Corporate Wellness. Experiences designed for the practical implementation of coursework. Involves random populous rehabilitation, as well as executive and industry, senior citizen centers, and rest homes. (1-10F,Sp,Su) ®

6540. Wellness Programming. Emphasizes exercise prescription writing and exercise prescription implementation. Students test prescriptions in laboratory setting. Prerequisites: PEP 6400, 6450. (3Sp)

6690. Analysis of Teaching Physical Education. Designed to provide graduate students with practicum experiences in the analysis of physical education, via micro teaching and observation of physical education classes. (3Sp)

6730. Worksite Guidance and Counseling. Provides cardiac rehabilitation/corporate wellness graduate students with basic understanding of exercise and health psychology. (3F)

6800. Biomechanics and Ergonomics of Health, Industry, and Sport. Understanding and application of biomechanical and ergonomic principles fundamental to efficient human movement in health, industry, and sport. Prerequisite: PEP 4200. (3Sp)

6810. Research Methods in Health Sciences. Explores basic to advanced concepts contained in research and statistical design, as applicable to health sciences. (3F)

6820. Wellness Certification and Technology. Provides instruction and experience in wellness technology and wellness certification. Students learn use of current technology in the fitness industry and obtain certain wellness certifications. (2Sp)

6830. Motor Learning. Comprehensive review and analysis of research in the area of motor skills which bears upon the teaching of physical education activities. (3Sp)

6900. Independent Study. Student conducts independent projects under direction of one or more professors. Provides student with opportunity for individualized study. (1-3F,Sp,Su) ®

6910. Independent Research. Allows graduate students to pursue personal research interests by formalizing an independent project under the guidance of a graduate professor. (1-3F,Sp,Su)

6960. Master's Project. Allows students opportunity to develop creative and applicable educational project. (3F,Sp,Su)

6970. Thesis. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. Provides graduate students with continued support and advisement. Usually taken following completion of all coursework required for the degree. (1-9F,Sp,Su) ®

7550. Practicum in the Evaluation of Instruction. Field-based experience involving supervision of student teachers in Department of Health, Physical Education and Recreation. (1-6F,Sp,Su) ®

Professional Courses in Parks and Recreation (PRP)

1000. Introduction to Parks and Recreation. Introduces the role of leisure recreation and parks in society. Discusses history, trends, issues, and values in society. Describes public and private agencies providing recreation. (3F)

1500. Social Recreation Leadership. Information and practical experience in the organization and management of social recreation activities. Planning, programming, and evaluation techniques given for a variety of age groups. (2F,Sp)

2250. Introductory Cooperative Work Experience. An introductory-level educational work experience in a cooperative education or business position as approved by the department. Repeatable for up to 6 credits. (1-6F,Sp,Su) ®

2500. Outdoor Recreation Management. Explores philosophy, meaning, and value of outdoor recreation in society. Gives management agency overview. Emphasizes organizing and leading outdoor recreation pursuits. (3Sp)

3000. Recreation Progamming. Studies recreation programming, including methods, models, and classification. Also includes analysis of activities, organizational structures, and evaluation techniques. (3F)

***3100. Leisure and Aging.** Examines relevance of leisure as a means of enhancing the quality of life for the aging person. Topics include retirement; physical, social, psychological, and emotional changes; and leisure programming considerations. (2F)

CI 3500. Community Recreation Administration. Examines community recreation organization with emphasis on administrative skills and functions, including budgeting, personnel management, and grantsmanship. Prerequisites: PRP 1000 and 3000. (3Sp)

3750. Commercial Recreation and Tourism. Examines history, organization, and management of commercial recreation and tourism enterprises. Studies entrepreneurship, feasibility, marketing, and management of projects. (3F)

4000. Therapeutic Recreation. Examines special population groups served by recreation, including institutional procedures, clinical application, and activity programming. Prerequisite: PRP 4500. (3Sp)

***4200. Trends and Issues in Therapeutic Recreation.** Examines current trends and issues in therapeutic recreation and how they affect the therapeutic recreation profession. Instruction in licensing requirements for eligibility for TRT and TRS licensure and certification. Prerequisite: PRP 4000. (3Sp)

4250. Advanced Cooperative Work Experience. Cooperative education work experience with increased levels of complexity, wherein students gain a more professional level of experience as they advance toward completion of the program. (1-12F,Sp,Su) ®

***4300. Legal Aspects of Recreation and Leisure.** Focuses on legal aspects of recreation and park programs, management, and administration. Provides basic knowledge and understanding of risk management process, legal terms, and their application. (2Sp)

4400. Recreation Park and Facility Management. Studies recreation park and facility management, including examination of supply, demand, population, maintenance, and safety in developing appropriate areas and facilities for parks. (3Sp)

4500. Diverse Populations. Explores characteristics, behaviors, and programming techniques used to meet recreational needs of varied population groups and all degrees of disabilities. (3Sp)

4700. Internship Seminar. In preparation for PRP 4750, students identify interships and prepare written materials and objectives for internship assignment. (1Sp)

4750. Recreation Internship. Practical, off-campus management experience with cooperating parks and recreation agency. Prerequisites: PRP 1000, 2250, 3000, 4500. (9F,Sp,Su)

4970H. Honors Senior Thesis. Culminating experience within the department for honors students. Student works closely with faculty mentor in an extensive project in the student's area of interest. (1-6F,Sp,Su)

CI 5000. Seminar in Recreation. Student analysis, papers, and presentations of current issues and problems in recreation. Includes discussions with professionals and development of resume. Prerequisites: PRP 1000, 1500, 2250, 2500, 3000, 3500, 3750, 4000, 4400, 4500. (3Sp)

5900. Independent Study. Students work on special projects and research out of the classroom, with approval and guidance of instructor. (1-3F,Sp,Su) ®

5910. Independent Research. (1-3F,Sp,Su) ®

Activity Courses in Physical Education (PE)

1000. Skiing. Alpine ski instruction for all students. Offered for beginning, intermediate, and advanced levels. Focuses on knowledge, techniques, equipment, and safety necessary for participating in and enjoying alpine skiing. (1Sp) ®

1020. Cross Country Skiing. Focuses on knowledge, techniques, equipment, and safety necessary to participate in and enjoy winter recreational activities, including cross country ski touring and snowshoeing. (1Sp) ®

1100. Basketball. Designed to help the recreational player become more familiar with the basic skills involved in the game of basketball. During the course, games and/or a “mini” tournament will be played. (1Sp) ®

1110. Flag Football. Designed to help students develop and understand the skills and strategies of recreational flag football through active participation. (1F) ®

1120. Soccer. Designed to help students develop and understand the skills and strategies of soccer through active participation in drills and games. (1F,Sp) ®

1130. Softball. Designed to help students develop and understand the skills and strategies of recreational softball through active participation. (1Sp) ®

1140. Ultimate Frisbee. Designed to enhance each student's skills and abilities in ultimate frisbee. Emphasizes cardiovascular and muscular fitness. Course is progressive, with increase in intensity as the individual improves abilities. (1F,Sp)®

1150. Volleyball. Designed to help students enhance their basic volleyball skills and enjoyment of the game through active participation. (1F,Sp) ®

1200. Badminton. Through active participation, students learn basic skills, rules, and strategies of singles and doubles badminton. (1F,Sp) ®

1210. Cycling. Conditioning class emphasizing training. Introduction to road safety principles, various riding techniques, and cycle maintenance. Sections of road and mountain cycling offered. (1F,Sp) ®

1220. Golf. Designed for the beginning and novice golfer. Basics of individual grip, set-up, posture, and swing. Includes putting, chipping, weight transfer, and balance. (1F,Sp) ®

1230. Gymnastics. Designed to enhance current abilities and teach skills according to the individual student's abilities. Skills taught through drill work and lecture. (1F,Sp) ®

1240. Racquetball. Designed to help students understand the general rules and strategies of racquetball, improve competitive skills, and play safely and effectively. (1F,Sp) ®

1250. Tennis. Designed for students desiring a basic understanding of tennis. Improvement of skills and strategies through active participation in drills and games. Both beginning and intermediate level sections offered. (1F,Sp,Su) ®

1260. Billiards. Designed to develop basic knowledge and concepts for playing a variety of games. Focuses on stroke mechanics, shot selection, and strategy. (1F,Sp,Su)

1270. Bowling. Provides students with the knowledge, skills, and strategies for successful participation and enjoyment. (1F,Sp,Su) ®

1280. Fly Fishing. Provides students with the opportunity to develop the skills, knowledge, and strategies for successful participation and enjoyment. (1F,Sp,Su) ®

1300. Jog/Walk. Provides students with opportunity to achieve and maintain personal fitness through jogging and/or walking. (1F,Sp,Su) ®

1310. Conditioning. Designed to improve overall flexibility, strength, and endurance capacity of the body. (1F,Sp) ®

1320. Weight Training. Demonstration of proper weight training techniques. Helps students understand basic concepts related to weight training, in order to gain strength, improve muscle tone, and start or continue a healthy lifestyle. (1F,Sp) ®

1330. Aerobics. Fitness program, primarily designed to improve cardiovascular fitness, muscular endurance, and flexibility. (1F,Sp) ®

1400. Swimming. Designed for swimmers and nonswimmers desiring to improve swimming skills and enhance cardiovascular and muscular fitness. Emphasizes swimming safety and enjoyment in a variety of water activities. Beginning, intermediate, and lap swim sections offered. (1F,Sp,Su) ®

1500. Self-Defense. Covers skill development in terms of defensive capability, environment assessment, situation management, and the legal ramifications of the use of force. Available to the general University student body. (1F,Sp) ®

1620. Hiking. Provides skills and knowledge in hiking, with an emphasis on leave no trace techniques and safe operations in an outdoor environment. (1F,Sp,Su) ®

1630. Orienteering. Provides skills and knowledge in the fundamentals of orienteering with an emphasis on wilderness travel techniques and safety in the outdoors. (1F,Sp,Su) ®

1640. Rock Climbing: Basic. Provides skills and knowledge in basic rock climbing, teaching safe judgment and proper techniques in a climbing gym. (1F,Sp,Su) ®

1650. Outdoor Survival. Provides skills and knowledge in the fundamentals of outdoor survival and developing a wilderness ethic to allow for safe participation in wilderness activities. (1F,Sp,Su) ®

1670. Wilderness First Aid. Provides outdoor leaders with an introduction to wilderness first aid. Upon completion of course, students may receive a two-year wilderness first aid certification. (1F,Sp,Su) ®

1690. National Outdoor Leadership School Course. Provides students with the opportunity to earn USU credit for attending National Outdoor Leadership (NOLS) courses. (3-18F,Sp,Su) ®

1710. Kayaking: Basic. Provides skills and knowledge in kayaking. (1F,Sp,Su) ®

1730. Canoeing. Provides skills and knowledge in canoeing and water safety with an emphasis on leave no trace techniques. (1F,Sp,Su) ®

1740. Sailing. Provides skills and knowledge in the fundamentals of sailing and water safety. (1F,Sp,Su) ®

1750. Windsurfing. Provides skills and knowledge in the fundamentals of windsurfing and water safety. (1F,Sp,Su) ®

1810. Winter Exploration. Provides skills and knowledge for safe winter camping using backpacking equipment. Assists in the development of high outdoor ethics. (1F,Sp) ®

1820. Snowshoeing. Provides skills and knowledge of snowshoeing, with an emphasis on leave no trace techniques and development of safe winter activity skills. (1F,Sp) ®

1830. Yurt Camping. Provides skills and knowledge for safe winter camping using a yurt for shelter. Assists in the development of high outdoor ethics. (1F,Sp) ®

2000. Personal Instruction and Conditioning. Designed for members and prospective members of varsity teams, as well as for the student/athlete requiring a personalized program. (1F,Sp) ®

2010. Varsity Cross Country. Designed to meet the needs of varsity student/athletes in cross country. (1F) ®

2020. Varsity Football. Designed to meet the needs of varsity student/athletes in football. (1F) ®

2030. Varsity Soccer. Designed to meet the needs of varsity student/athletes in soccer. (1F) ®

2040. Varsity Volleyball. Designed to meet the needs of varsity student/athletes in volleyball. (1F) ®

2050. Varsity Indoor Track and Field. Designed to meet the needs of varsity student/athletes in indoor track and field. (1Sp) ®

2060. Varsity Basketball. Designed to meet the needs of varsity student/athletes in basketball. (1Sp) ®

2070. Varsity Gymnastics. Designed to meet the needs of varsity student/athletes in gymnastics. (1Sp) ®

2080. Varsity Track and Field. Designed to meet the needs of varsity student/athletes in track and field. (1Sp) ®

2090. Varsity Softball. Designed to meet the needs of varsity student/athletes in softball. (1Sp) ®

2100. Varsity Golf. Designed to meet the needs of varsity student/athletes in golf. (1F,Sp) ®

2110. Varsity Tennis. Designed to meet the needs of varsity student/athletes in tennis. (1F,Sp) ®

2120. Varsity Weight Training. Designed for varsity athletes. Emphasizes strength development. (1F,Sp,Su) ®

3000. Dynamic Fitness. Designed to develop positive health practices in the areas of physical activity, diet, rest, and relaxation of living through classroom, laboratory, and activity experiences. (3F,Sp,Su) ©

4000. Lifeguard Training. Designed to prepare students as pool or nonsurf open water lifeguards. Presents knowledge and skills necessary for lifeguard functions. American Red Cross certification available. (2F,Sp) ®

4050. Water Safety Instructor. Attention given to methods of teaching swimming and lifesaving. Presents knowledge and skills necessary for lifeguard functions. American Red Cross certification available. Offered through Evening School. (2F,Sp) ®

Dance Education Class (DE)

1900. Dance. Aids in development of movement skills, coordination, strength, and flexibility. Helps students to understand basic movement terminology and to become familiar with the fundamentals of movement. (1F,Sp)

Dance West Summer Classes (DE)

1700W. Jazz. Provides training and experience in the styles of jazz, one of the popular forms of American dance. (1Su) ®

1800W. Dance West Performance. Students will learn dances to be performed in "The West: America's Odyssey." Prerequisite: Audition. (1-3Su) ®

1840W. Beginning Classical Ballet. A discipline in recognized classic form. Includes barre exercises, port de bras, and center practice in balance, jumping, and turns. (2Su) ®

1870W. Beginning Classical Modern Dance. Designed to develop coordination, ease, and poise in handling the body. Focuses on dance as an art using the body as a medium of expression. (2Su) ®

2850W. Intermediate Classical Ballet. Barre exercises, port de bras, and center practice in balance, jumps, beats, and turns with more emphasis on exactness and precision of line. Prerequisite: One year of ballet or permission of instructor. (2Su) ®

2880W. Intermediate Classical Modern Dance. Stresses alignment of the skeletal structure, freedom and movement of the torso, and technical work enabling the dancer to secure the natural axis of balance. Prerequisite: One year modern dance or permission of instructor. (2Su) ®

3800W. Advanced Ballet. Pointe and Pas de Deux. Intensified center floor work concentrating on longer adagio and allegro combinations. Prerequisite: Five years of ballet or permission of instructor. (3Su) ®

4500W. American Character Ballet. History through movement from seventeenth century European dance through contemporary styles. (3Su) ®

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*Taught 1998-99.

**Taught 1999-2000.

[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of
History

College of Humanities, Arts and Social Sciences

Head: Professor *Norman L. Jones*, medieval, early modern Europe, Britain, Christianity
Office in Main 323, (435) 797-1290

Associate Head: Associate Professor *Frances B. Titchener*, ancient Greece and Rome, Latin, Greek

Graduate Program Coordinator: Professor *Carol A. O'Connor*, Twentieth Century U.S., cities and communities, immigration history

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Professors *Jay Anderson*, folklore, folklife, film studies; *Anne M. Butler*, U.S. West, U.S. women, editor of *Western Historical Quarterly*; *C. Robert Cole*, England, modern European history; *Clyde A. Milner, II*, U.S. West, American Indian, American Studies, executive editor of *Western Historical Quarterly*, director of Mountain West Center for Regional Studies; *F. Ross Peterson*, U.S. modern political history, Black history; *Barre Toelken*, folklore and folklife, director of Folklore Program; **Professors Emeritus** *Stanford Cazier*, American intellectual history; *William F. Lye*, Africa, India, Canada; *Charles S. Peterson*, U.S. Western history; **Associate Professors** *Mark L.*

Damen, ancient world, theatre history, Latin, Greek; *R. Edward Glatfelter,* Russia and East Asia, associate dean of College of Humanities, Arts and Social Sciences; *David R. Lewis,* American Indian, environmental, Utah, co-editor of *Western Historical Quarterly*; *Daniel J. McInerney,* American intellectual history, Nineteenth Century; *Michael L. Nicholls,* early American history; *Leonard N. Rosenband,* France, European economic and labor history; *Stephen C. Siporin,* folklore, oral narrative folklore, folk art; **Assistant Professors** *Christopher A. Conte,* Africa, world, and environmental history; *Peter Mentzel,* Eastern Europe, Ottoman empire, Islamic civilization; *David J. Weiland,* colonial Latin America, imperial Spain, economic history; **Adjunct Assistant Professors** *C. Blythe Ahlstrom,* United States history; *Denise O. Conover,* American diplomatic history, U.S. military, American civilization; **Lecturer** *Carol McNamara,* history of political thought

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA) in History; participates in Master of Social Sciences (MSS)

Undergraduate Programs

Objectives

The Department of History offers a flexible program to accomplish the following objectives:

1. To train undergraduates to research, analyze, synthesize, and communicate reasonable conclusions about the past by using the historical method.

2. To inculcate cultural literacy and provide the knowledge necessary for informed decision-making by citizens of Utah, the United States, and the world.

3. To provide students with crucial work skills in research, analysis, communication, and collaboration, as well as enriching their lives.

4. To contribute to the liberal arts curriculum of the University through general education, general interest courses, the history major, the history teaching major, minors in history and classics, and the interdisciplinary programs of folklore, American studies, British and commonwealth studies, and the Liberal Arts and Sciences Program.

History is a reading- and writing-intensive program.

Requirements

Departmental Requirements. New freshmen accepted in good standing by the University may apply for admission to the History Department. Students transferring from another institution or another major will be admitted if they have a minimum 2.0 GPA in history courses and an overall minimum GPA of 2.5. A minimum 2.75 GPA is required for entry into the teacher education program.

Candidates for a degree must earn a grade of *C* or better in all history courses used to meet the requirements for a history major or minor, a history teaching major or teaching minor, or a classics minor.

General Education

New freshmen entering the Department of History fall quarter 1990 or later are required to complete a Liberal Arts and Sciences (LAS) area studies certificate, as well as fulfill the University Studies (General Education) requirements. Students working on an LAS certificate should see an adviser in the Science/HASS Advising Center, Student Center 304, as soon as possible.

Transfer students with fewer than 31 semester credits and entering freshmen in all history majors are also required to complete an LAS certificate as part of their University Studies requirements. The LAS orientation course (LAS 2020 or 2120) and two clusters must be completed with a minimum GPA of 2.5. The following three policies must be observed: (1) A maximum of 3 advanced placement or CLEP semester credits per cluster are permitted in appropriate substitutions; (2) Up to 3 credits can be duplicated in two clusters; (3) No more than one course per cluster from a student's major department may double count. Capstone and other courses required in both the major and the clusters are excluded from the third policy and may be used in both the major and the LAS certificate. For details of this certificate, see pages 278-279 of this catalog and the current *Schedule of Classes.*

Bachelor of Arts (BA) Degree in History

The BA degree requires a minimum proficiency in a foreign language. This proficiency may be established in one of the following ways:

1. 16 credits in a single language or 10 credits each in two languages.

2. Documentation of a proficiency level of “intermediate low” or better through an examination administered by the USU Department of Languages and Philosophy.

3. Completion of any upper-division foreign language course constituting a third-year course of study with a grade of *C* or higher.

Bachelor of Science (BS) Degree in History

The BS degree in history requires 16 credits of math and science beyond the University Studies requirements. Of the 16 credits, 3 must be earned in a statistics course, preferably in social science statistics. The remaining 13 credits must include a course series from the following list: Biol 1210, 1220; Chem 1210, 1220; Geol 1150, 3200; Phyx 2110, 2120, 2210, 2220.

History Major. Thirty-six credits of history coursework are required. A grade of *C* or better must be earned in all history courses used for the major. Every student is required to complete the following foundation courses as soon as possible after entry to the major: Hist 1040 and 2700. Each major should complete *one* of the following three courses in the area of modern civilizations: Hist 1030, 1050, or 2710. Each major must complete one of two required world civilization courses: Hist 1020 or 1060. Students should complete their remaining 21 credits by taking 3000- and 4000-level history courses. Since new courses may be approved from time to time, any upper-division course listed in the current *Schedule of Classes* under *History* is acceptable. Every senior must take Hist 4990, the capstone course for the major.

No more than 3 credits of Hist 4910 can be applied toward the major.

Since the study of history requires an understanding of many fields of human endeavor, students majoring in history must select a minor. Historians are encouraged to take electives in fields that

will broaden their knowledge of the world and are closely allied to history, such as literature, economics, geography, anthropology, political science, sociology, classics, philosophy, or foreign language.

Students wishing to undertake graduate work should pursue the BA degree. During their senior year, they should take the graduate record exam (GRE).

Teaching Major in History. Thirty-nine credits of history coursework are required. A grade of *C* or better must be earned in all history courses used for the major. Every student is required to complete the following foundation courses as soon as possible after entry to the major: Hist 1040 and 2700. Each major should complete *one* of the following three courses in the area of modern civilizations: Hist 1030, 1050, or 2710. Each major must complete one of two required world civilization courses: Hist 1020 or 1060. Students should complete their remaining 21 credits by taking 3000- and 4000-level history courses. A minimum of two courses must be taken from each of the following areas: U.S. history, European history, and world history. Since new courses may be approved from time to time, any upper-division course listed in the current *Schedule of Classes* under *History* is acceptable. Every senior must take Hist 4990, the capstone course for the major. All teaching majors in history must also take Hist 4850 or 4860 or 4870.

All teaching majors must also have a teaching minor in an area for which teaching certification can be granted.

No more than 3 credits of Hist 4910 can be applied toward the major.

Minor in History. Twenty-one credits of coursework are required. A grade of *C* or better must be earned in all history courses used for the minor. Every student is required to complete the following foundation courses: Hist 1040 and 2700. Each student should complete *one* of the following three courses in the area of modern civilizations: Hist 1030, 1050, or 2710. Each student must complete one of two required world civilization courses: Hist 1020 or 1060. Students should complete their remaining 9 credits by taking 3000- and 4000-level history courses.

No more than 3 credits of Hist 4910 can be applied toward the minor.

History Teaching Minor. Twenty-four credits of coursework are required. A grade of *C* or better must be earned in all history courses used for the minor. Every student is required to complete the following foundation courses: Hist 1040 and 2700. Each student should complete *one* of the following three courses in the area of modern civilizations: Hist 1030, 1050, or 2710. Each student must complete one of two required world civilization courses: Hist 1020 or 1060. All teaching minors in history must also take Hist 4850 or 4860 or 4870. Students should complete their remaining 9 credits by taking 3000- and 4000-level history courses.

No more than 3 credits of Hist 4910 can be applied toward the minor.

Classics Minor with Emphasis in Civilization. Twenty-one credits of coursework are required. All students must take Hist 3130 and 3150. They must take *one* of the following three courses in ancient archaeology: Hist 3110, Anth 1030, or Anth 3170. They must take *one* of the following three ancient literature courses: Clas 1100, 3210, or Thea 5290. They must take *one* of the following two ancient art courses: Hist 4210 or Art 4710. They must take *one* of the following two ancient thought courses: PolS 4310 or Phil 3100. The remaining 3 credits are elective and may include any of the courses listed above.

Classics Minor with Emphasis in Latin Language. Thirteen credits are required. All students must complete Hist 3150 and 7 credits of upper-division (3000- and 4000-level) courses in Latin language. They must also complete *one* of the following courses: Art 4710, Clas 1100, 3210, Hist 4210, and Thea 5290.

Classics Minor with Emphasis in Greek Language. Thirteen credits are required. All students must complete Hist 3130 and 7 credits of upper-division (3000- and 4000-level) courses in classical Greek language. They must also complete *one* of the following courses: Art 4710, Clas 1100, 3210, Phil 3100, and Thea 5290.

Academic Opportunities

Departmental Honors in History. Students in the department with a minimum GPA of 3.5 may apply to pursue an honors degree in history. Those interested should consult the department honors coordinator.

Phi Alpha Theta. History students with a minimum GPA of 3.1 in history classes and an overall minimum GPA of 3.0 are eligible for membership in the national history honor society, Phi Alpha Theta. Those interested should consult the faculty adviser for Phi Alpha Theta.

Undergraduate Teaching Fellows. The UTF program is designed to provide students, particularly potential teachers, with the opportunity to assist professors and, thereby, learn first-hand about the nature of the profession. UTFs must maintain a minimum GPA of 3.0 and be sponsored by a professor. Application forms are available in the History Department office.

Additional Information

For updated information concerning programs and courses offered by the Department of History, visit the departmental web page at http://www.usu.edu/~history.

Financial Support

Scholarships, grants-in-aid, and work-study programs are available through the University. The History Department offers tuition waivers and scholarships to outstanding students. In addition, undergraduates may be employed as research assistants and clerical assistants within the department. For current information on scholarships and employment opportunities, consult the department head.

Graduate Programs

Admission Requirements

Graduate applicants may be admitted to the program for either the master of arts or master of science in history if they meet the following qualifications: (1) hold a baccalaureate degree; (2) have at least a 3.0 cumulative GPA over the last 60 credits of undergraduate work, with a 3.5 GPA in history courses recommended; (3) submit Graduate Record Examination (GRE)

general test scores, with a **required** minimum score of 500 on the verbal section, and a **recommended** score of 550 on *both* the quantitative and analytical portions of the exam; (4) submit three letters of recommendation from persons acquainted with the applicant's academic performance and potential; and (5) submit a brief statement of proposed fields of interest and career goals.

The Department of History also strongly recommends that applicants have either an undergraduate major or minor in history or a closely related field (i.e., American studies, classics). Familiarity with one or more foreign languages is highly desirable and is required for the master of arts degree and for master's level research in many fields of history. Applications will be strengthened by the submission of an example of the student's historical writing, such as a paper (about 15 pages in length) written for a seminar or upper-division course.

The final recommendation for admission will be made upon consideration of all the above factors by the department and the School of Graduate Studies.

Utah State University is committed to providing equal educational and employment opportunity regardless of race, sex, color, religion, national origin, marital or parental status, physical or mental disability, veteran status, or age. USU also has a policy prohibiting sexual harassment of students, faculty, and staff. Equal opportunity applies to all aspects of employment: recruiting, hiring, promotion, training, benefits, and salary. Equal educational opportunities include admission, access to course offerings, financial assistance, housing, and extracurricular activities.

Degree Programs and Additional Requirements

Master's Degree, Plan A (Thesis). The thesis option should be taken by anyone intending to do research or enter another program for the doctoral degree. A master of arts, master of science, or master of social sciences degree can be completed with this option.

The program consists of 30 semester credits beyond the bachelor's degree, 6 credits of which must be in thesis research. Students must take Hist 6000, as well as either Hist 6010 or 6020, or another theory-intensive course approved by the director of graduate studies. Students may apply a maximum of 6 internship credits earned while working in an archives, for a museum, on the staff of a scholarly journal, or as a teaching intern in an upper-division undergraduate course.

The remainder of the 30 credits may be taken as electives in history or related courses relevant to the student's program.

Upon arrival at USU, students are urged to meet with the departmental graduate adviser, who will direct them to one or more faculty members with similar interests. Through consultations with the graduate and faculty adviser, the first-year student will form a thesis committee and formulate a course of study. By the end of the first year, most students will have submitted to their committees a proposal for the thesis, which they will write under the close supervision of their supervisors. The oral defense usually takes place in the spring semester of the second year.

Master's Degree, Plan B (Nonthesis). A nonthesis master's program can help a student attain employment in many areas, but is not recommended for students planning to secure a doctorate. A master of arts, master of science, or master of social sciences degree can be completed with this option.

The Plan B program consists of 30 credits beyond the bachelor's degree. The course requirements are identical to those of the Plan A program, except that only 3 thesis credits are permitted.

Students completing the Plan B program do not write a full-length thesis. Instead, Plan B students write a research paper of approximately 30 pages in length and submit a portfolio of their graduate writing, which includes three distinct pieces of writing. Students defend their Plan B research papers and writing portfolios before their major professor and the members of the supervisory committee. Final approval of the Plan B rests with the department, rather than with the School of Graduate Studies.

Master of Arts. To receive a master of arts (MA) degree, students must successfully complete two years of foreign language study at the undergraduate level. If two years of undergraduate language already appear on the student's transcript, he or she must demonstrate current competence through successful completion of a language exam. For some languages, a student may be permitted to demonstrate competency through a standardized examination. For other languages, a student may take an advanced-level course, for which a grade of *B* or higher proves competency. In all cases, an individual assessment must be made of a student's language status. For further information, see page 65.

Students planning to continue on for a doctorate should be aware that many doctoral programs in history require that students pass written proficiency exams in two languages.

Master of Science. To receive a master of science (MS) degree in history, students must demonstrate current competence in computer science or the use of statistics.

Master of Social Sciences (MSS). Like the MA and MS in history, the Plan A option for the master of social sciences (MSS) degree requires a minimum of 30 credits, and the Plan C option requires a minimum of 33 credits. Both options require a minimum of 15 credits in a major discipline, plus a minimum of 15 credits from one of the following two tracks. *Track A:* a minimum of 15 credits from two approved minor areas, with at least two courses in each minor area. *Track B:* A minimum of 15 credits from an approved minor and a Liberal Arts and Sciences cluster, with at least two courses in the minor and two courses in the cluster. Accepted minor disciplines include instructional technology, economics, geography, political science, psychology, and sociology/anthropology. This degree is designed for secondary school teachers who need more training to certify in additional teaching fields or who simply wish to deepen their understanding of a related field.

Students in the MSS Program are required to take Hist 6000 and 3 credits of Hist 6970 for the Plan B option. A supervisory committee consists of a major professor in history and two committee members, each representing one of the student's minor fields. MSS students, like other Plan B students in history, must write a research paper of approximately 30 pages in length and submit a portfolio of their graduate writing, consisting of three distinct pieces of work, one each from their major and two minor fields. An oral defense of the student's Plan B paper and portfolio is held before the student's supervisory committee. To receive an MSS degree in history, students must demonstrate current competence in computer science or the use of statistics.

Financial Assistance

The primary financial assistance offered by the Department of History is through teaching assistantships. Each year, the History Department offers to qualified students, on a competitive basis, a total of seven teaching assistantships. These assistantships entail approximately 20 hours of work per week, assisting faculty members with departmental introductory survey courses. The award carries a stipend and an out-of-state tuition waiver. To keep their assistantships, teaching assistants must maintain a GPA of 3.0 (or a *B* average) and be a full-time student (see page 59). While enrolled in the MA or MS program, teaching assistants may hold teaching assistantships for a maximum of two years. Applications for teaching assistantships should be postmarked *no later than February 1*, for the upcoming academic year.

In addition, financial assistance is available through *Western Historical Quarterly*, a journal published at USU. The editors of the journal offer, during alternate years, the S. George Ellsworth Editorial Fellowship and the Robert M. Utley Editorial Fellowship. These fellowships are awarded to highly qualified students working as editorial assistants in that office. These fellowships are nationally competitive and allow college students to learn all aspects of journal production. They carry a stipend (with additional funding possible during the summer) and a waiver of the out-of-state portion of the tuition. Materials should be postmarked no later than February 1, for the upcoming academic year. Applicants will be notified in early April.

Funding for the S. George Ellsworth Fellowship is provided by the *Western Historical Quarterly*, the School of Graduate Studies, the College of Humanities, Arts and Social Sciences, and the S. George Ellsworth Endowment of the Mountain West Center for Regional Studies. The S. George Ellsworth Fellowship is being offered for the 1999-2000 academic year.

Funding for the Robert M. Utley Fellowship is provided by the *Western Historical Quarterly* and the School of Graduate Studies. The Robert M. Utley Fellowship is being offered for the 1998-1999 and 2000-2001 academic years. For further information about *Western Historical Quarterly* fellowships, write to:

Western Historical Quarterly
Utah State University
0740 Old Main Hill
Logan UT 84322-0740
or send e-mail to: bstewart@wpo.hass.usu.edu.

The application deadline for both fellowships is February 1, for the upcoming academic year.

Additional Funding. In addition to teaching assistantships and the *Western Historical Quarterly* editorial assistantships, the School of Graduate Studies awards a limited number of scholarships. To be eligible for these awards, all students should complete the application for admission and send it, along with GRE scores and letters of recommendation, to the School of Graduate Studies by February 1. A financial aid application form (which may be obtained from the History Department) should be returned to the History Department by February 1.

Students interested in establishing eligibility for federal loans and work-study will need to complete the Free Application for Federal Student Aid (FAFSA) and submit it to: Financial Aid Office, Utah State University, 1800 Old Main Hill, Logan UT 84322-1800. Questions about eligibility should be directed to the Financial Aid Office, tel. (435) 797-0173.

Career Opportunities

Some graduates of USU's master's program continue their formal education in PhD programs or law schools. Others find employment in the two-year college or secondary school systems, as teachers or administrators. Still others work for historical societies, museums, publishing firms, and a variety of enterprises in the private sector.

Additional Information

Current announcements and other information are posted to the History Department web site, http://www.usu.edu/~history.

History Courses (Hist)

BHU 1020. Cultural and Economic Exchange in the Pre-Nineteenth Century World. Surveys pre-Nineteenth Century cultural and economic interactions in important zones of exchange. Regional focus determined by instructor. Themes may include: trade, religious conversion, migration, slavery, warfare, and other types of cross-cultural exchange. (3F,Sp) ©

BHU 1030. The Modern World. Survey of world history from the beginning of the nineteenth century to the present. (3F,Sp,Su) ©

BHU 1040. Foundations of Western Civilization: Ancient and Medieval. Survey of institutions and developments of early and medieval Western civilization from its Mediterranean origins to the beginning of the early modern period. (3F,Sp,Su)

BHU 1050. Foundations of Western Civilization: Modern. Survey of the institutions and developments in Western civilization from 1500 to the present. (3F,Sp,Su)

BHU 1060. Introduction to Islamic Civilization. Survey of Islamic civilization from the Prophet Muhammed to the present. (3F,Sp)

1600. American Cultures in Film. Introduction to major ethnic groups in America and their treatment in recent feature films. Also taught as Engl 1600. (3F,Sp)

BAI 1700. American Civilization. Fundamentals of American civilization. Covers history, political system, and economic institutions of the United States. Fulfills American Institutions requirement. (3) ©

BHU 1710. Introduction to Folklore. Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). (3F,Sp)

2010. Special Topics Seminar. Study of special cross-cultural topics, including Imperial Paris, British India, Slavery in America, and Ute History. (3F,Sp,Su)

BHU 2040. British and Commonwealth Cultures. Introduction to the diverse cultures of the British Isles and the Commonwealth of the present day. Particular emphasis on regional identity in relation to multiculturalism and internationalization. (3F)

BAI 2700. United States to 1877. Survey of the development of American society, economy, culture, and politics to 1877. To receive American Institutions credit, students must complete *both* Hist 2700 *and* 2710. (3F,Sp,Su)

BAI 2710. United States 1877-Present. Survey of the development of American society, economy, culture, and politics since 1877. To receive American Institutions credit, students must complete *both* Hist 2700 *and* 2710. (3Sp)

2720. Survey of American Folklore. Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. (3Sp)

DHA 3070. Perspectives in Folklore. In-depth study of folklore for nonmajors. Topics vary according to faculty expertise. (3F,Sp)

DHA, CI 3110. Ancient Near East. Survey of history and civilization of ancient Mesopotamia, Egypt, and Israel, from prehistory to 500 B.C. Writing intensive. Prerequisite: Engl 2010 or equivalent. (3F,Sp)

DHA, CI 3130. Greek History. History of Greece from Neolithic period to modern times. Special emphasis on politics, art, literature, and civilization. Writing intensive. Prerequisite: Engl 2010 or equivalent. (3F,Sp)

DHA, CI 3150. Roman History. History of Rome from Neolithic era to "fall" of the Western Empire. Special emphasis on politics, art, literature, and civilization. Writing intensive. (3F,Sp)

DHA, CI 3220. Medieval European Civilization, 500-1500. Provides students with overview of major themes in medieval European history from 500 to 1500 A.D. Also introduces major historiographical problems related to this period. Writing intensive and document based. Prerequisite: Engl 2010 or equivalent. (3)

3230. Early Modern Europe. Explores major themes of early modern European history, such as secularization, the rise of the nation state, the Reformation, and the birth of capitalism. Introduces major historiographical issues of the period. Reading and writing intensive. Prerequisite: Engl 2010 or equivalent. (3)

3240. Modern Europe from 1789 to the Present. Historical survey of Europe from the French Revolution to the present, with special emphasis on political and cultural implications of imperialism. Prerequisite: Hist 1050. (3F,Sp)

3260. History of Spain and Portugal. History of Iberian peninsula from fifteenth century to the present. Age of Exploration, conquest and colonization in the Americas and Africa, eighteenth century reforms, constitutional monarchies, civil wars, and twentieth century dictatorships. Writing intensive. Prerequisite: Engl 2010 or equivalent. (3)

3280. East Central Europe Since 1520. Examines history of East Central Europe, with special emphasis on growth of nationalism and establishment of the states of Czechoslovakia, Hungary, and Poland. Emphasizes research and writing. (3)

3310. Balkans Since 1389. Examines history of Balkan peninsula, with special emphasis on growth of nationalism and establishment of Bulgaria, Albania, Greece, Romania, and Yugoslavia. Emphasizes research and writing. (3)

3320. Tsarist Russia. Political, economic, and cultural development of Russian people to 1917. Writing and computer intensive. (3)

3330. The Soviet Union and its Heirs. Beginning with the Russian Revolution, surveys political, cultural, and economic history of the Soviet Union and the regional states emerging in its wake. Writing and computer intensive. (3)

3410. The Modern Middle East. Examines history of the Middle East (Arabian peninsula, Fertile Crescent, Egypt, Iran, and Turkey), with special emphasis on social and political currents which have shaped the area's history. (3)

3460. Comparative Asian History. Surveys history of Asian continent, analyzing common patterns in the cultures of West, South, Southeast, and East Asia. (3)

3480. History of China. Development of traditional Chinese culture and effect on that culture of the growth of western influence. Writing and computer intensive. (3)

3510. Africa and the World. Explores foundation of Africa's contemporary problems. Surveys Africa's history of interactions with Asia and Europe. In addition to writing several short essays covering readings and films, students investigate an aspect of cultural, political, or economic interaction and prepare a short research paper. (3)

3530. African Environmental History. Surveys changing historical relationship between Africans and their physical environment. Readings cover ecological change in arid, savanna, rain forest, and montane environments. Students also survey and evaluate the methods and sources used by environmental historians to explain environmental stress, degradation, and rehabilitation. (3)

3620. History of Colonial Latin America. Surveys art, culture, religion, and social organization of the Aztecs, Incas, and Mayas, and of the European dominated post-conquest. Introduces students to major historiographical problems in the field. Prerequisite: Engl 2010 or equivalent. (3)

3630. History of Modern Latin America. Introduces history and historiography of Latin America from the wars of independence to the contemporary era. Writing intensive. (3)

***CI 3700. Regional Folklore.** Study of folklore and folklife as a regionalizing process, rather than memorization of cultural contexts of a particular region. Regions examined through their folk culture include Brittany in Northwest France, the pine Barrens of New Jersey, and the Mormon cultural region of the Intermountain West. (3F,Sp)

CI 3710. Folklore Colloquium. Issues, problems, and methodologies in folklore study. Focus and instructor variable. (3Sp) ®

3720. Colonial America. Advanced survey of North American Colonies, emphasizing British experience, from their founding to 1763. Addresses major issues of interpreting America's beginnings. (3F)

3730. The New American Nation. Advanced survey of American history from 1763 to 1800, with special emphasis on historiography of the Revolution, creation of a Republic, and efforts to define the New Nation. (3Sp)

3750. Civil War and Reconstruction. Analysis of most trying period in U.S. history, with special emphasis on the course and results of the war. Prerequisite: Engl 2010. (3Sp) ©

DHA, CI 3760. The United States, 1900-1945. Analyzes scholars' approaches to U.S. history in the early twentieth century, with attention to socio-economic change, political reform, and transforming impact of American involvement in two world wars. Writing intensive. Prerequisite: Engl 2010 or equivalent. (3Sp)

3770. Contemporary America, 1945-Present. Domestic and foreign policy since World War II. Emphasizes Cold War, Civil Rights, and the political and social developments of contemporary United States. Contains intensive writing component. (3F) ©

3840. Twentieth Century American West. Considers emerging scholarly literature about the American West in the twentieth century, with attention to economic, environmental, and demographic questions. (3Sp)

DHA, CI 3850. History of Utah. Prehistory to the present. Examines environment and peoples of Utah, emphasizing use of primary documents to view and interpret Utah's past. Reading and writing intensive. Requires use of USU Special Collections and Archives. Prerequisite: Engl 2010. (3Sp)

DHA, CI 3950. Environmental History. Surveys writings from a relatively new genre of historical scholarship that attempts to explain the relationship between human society and the natural world. Readings focus on North America, but students also have opportunity to survey materials from the non-Western world. Course is reading and writing intensive, and requires students to conduct a research project in which they construct the history of a particular landscape. (3)

4210. Celtic Europe. History of Celtic peoples in British Isles, Scandinavia, and

continental Europe, from Neolithic times to the Norman Conquest in 1066. Computer intensive. (3F,Sp)

DHA, CI 4230. The History of Christianity in the West. Introduces students to history of Christian spirituality, asking how Christianity has been lived and how it has shaped lives over two thousand years. Uses original sources to introduce both the history and the historiographical problems surrounding the Christian religion. Writing intensive. (3)

4250. The Reformation in Britain: 1450-1688. Focuses on major research questions in the field of early modern studies. Explores causes and consequences of English Reformation and British Civil War. Writing and research intensive. (3)

4290. Europe and the French Revolution, 1700-1815. Examines causes and consequences of the French Revolution, introducing students to major themes in its interpretation. (3)

4310. History of Nationalism. Examines development of nationalism. Addresses different theories of nationalism, and then tests these theories with various case studies. Emphasizes research and writing. (3)

4320. History of Scientific Thought. Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and how it may be acquired. (3Sp)

4330. Modern Germany with Special Emphasis on the Twentieth Century. Historical survey of Germany beginning with Frederick the Great of Prussia, and considering the parallel history of the Habsburg empire and the Germany of the Kleinstaaterei. Considers wars and economic and political developments beginning in 1871, which produced the Nazi period. Prerequisite: Hist 1050. (3F,Sp)

4360. United States in the Age of Jefferson and Jackson. Examines history of United States from 1800 to 1846, from election of Jefferson to outbreak of war with Mexico. Prerequisite: Engl 2010. (3F)

4390. British Imperialism from 1688 to the Present. Topical survey of British Imperialism from 1688 to the present. Topics include the interaction of British imperialism with foreign policy; social, economic, and political institutions; the life of the mind and senses; and non-European cultures. Prerequisite: Hist 1050. (3Sp)

DHA, CI 4550. The History of Women and Family in America. Writing intensive course drawing on film, primary documents, and readings to trace the history of women, emphasizing race, class, and gender influences of each era. (3Sp)

DHA, CI 4600. The History of the American West. Traces major themes in nineteenth century history of the land between the Mississippi River and the Pacific Coast. In a writing intensive course, students use primary documents and secondary materials to discover the race, class, and gender issues that shaped the American West. (3Sp)

QI 4610. Themes and Methods in Economic History. Themes and methods in economic history, drawing on various societies and time periods. Designed to prepare future historians to work in their field. Prerequisite: Math 1030 or Stat 1040. (3)

4620. Advanced Seminar in American Studies. Builds upon foundation courses in American Studies and introduces students to theory and methods. Prepares students for the senior project. Required for American Studies majors and minors. Should be taken after completion of 12 credits in the major, but prior to completion of 21 credits. (3Sp)

CI 4640. Studies in the American West. Interdisciplinary course in American Studies, exploring the region of the West through the analysis of literary texts, historical sources, and socio-cultural materials. (3F)

CI 4690. American Studies Capstone Seminar. Required for students majoring in American Studies. Supports design and writing of senior thesis. Each student selects a topic integrating insights from classes taken by the individual student for the American Studies major. Also taught as Engl 4690. (3)

4700. Folk Material Culture. Introduction to folklife studies, emphasizing patterns of expressive culture (material, verbal, and customary) in selected folk groups. In-depth examination of vernacular primary sources, including documentary and feature films. (3F,Sp)

4710. American Indian History. Prehistory to the present. Emphasizes ethnohistory and the Western U.S., focusing on intercultural contacts, subsistence and environmental change, and contemporary political and economic issues, while analyzing primary documents and secondary readings. (3F)

4730. History of Black America. Study of African-American experience from slavery to freedom, as well as the difficult quest for democracy and equality in contemporary America. Includes both creative and research writing components. (3Sp,Su)

4740. American Immigration History. Examines history of immigration to the United States from Europe, Africa, Latin America, and Asia. Requires library research, especially in government documents, and use of oral history techniques. (3F)

4750. Advanced Folklore Workshop: Fife Conference. Focuses on one theme or topic in folklore, and offers lectures from nationally prominent scholars in the area. Taught during one week, every day and all day. To receive grade, student must write critical paper. (3Su) ®

****4790. American Religious History.** Varieties of American religious experience from settlement to the present. (3)

4810. American Military History. Covers evolution of the military in American history and society from 1775 to the present. (3)

4850. Interpreting the Past for Teachers. Focuses on nonformal educational experiences open to secondary school students outside of the classroom. Interpretive modes examined include historical film, documentaries, living history programs, history fairs and festivals, and historical novels and magazines. (3F)

4860. Teaching History. Designed to introduce history teaching majors to ethical and methodological issues arising in history classroom. (3F)

4870. Teaching World History: Themes, Approaches, and Materials. For history teaching majors only. Introduces students to a number of approaches to the study and teaching of world history. Students survey theoretical and pedagogical literature, then assemble a course package, which is presented to their peers. (3Sp)

4910. Special Studies in History. Examination of special areas and themes in history. (1-3) ®

4930. Directed Readings. Directed readings in any special historical field. For each credit granted, minimum of three books must be read. (1-3) ®

CI 4990. Special Topics in History. Senior history seminar emphasizing historiographical literacy, research, and writing skills in relation to a specific historical topic. Prerequisites: Lower- and upper-division courses in areas relating to topic in question. (3F,Sp,Su) ®

5700. Folk Narrative. Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. (3)

6000. Historical Methods and Research. Introduction to the historical profession, emphasizing research and writing skills, as well as the critical assessment of scholarly works. Should be taken at beginning of student's graduate program. Required for history master's students. (4F)

6010. History and Theory. Examination of major works that have influenced the

theory and practice of historical writing. History master's students are required to complete Hist 6010, 6020, or another theory-enriched course. (4)

6020. Approaches to History. Uses readings in particular instructor's field to underscore theories and methods different historians bring to their subject. History master's students are required to complete Hist 6010, 6020, or another theory-enriched course. (4) ®

6030. Research Seminar. Research in primary sources for graduate students. (4) ®

6100. Special Topics: Ancient History. Intensive readings and group discussions of selected topics in ancient history. (4) ®

6130. Special Topics: Early Modern European History. Intensive readings and group discussions of selected topics in early modern European history. (4) ®

6160. Special Topics: Modern European History. Intensive readings and group discussions of selected topics in modern European history. (4) ®

6200. Special Topics: Comparative World History. Intensive readings and group discussions of selected topics in comparative world history. (4) ®

6230. Special Topics: Middle Eastern History. Intensive readings and group discussions of selected topics in middle eastern history. (4) ®

6260. Special Topics: Asian History. Intensive readings and group discussions of selected topics in Asian history. (4) ®

6300. Special Topics: African History. Intensive readings and group discussions of selected topics in African history. (4) ®

6330. Special Topics: Latin American History. Intensive readings and group discussions of selected topics in Latin American history. (4) ®

6400. Special Topics: American History. Intensive readings and group discussions of selected topics in American history. (4) ®

6430. Special Topics: Western American History. Intensive readings and group discussions of selected topics in Western American history. (4) ®

6460. Seminar in Environmental History. Focuses on historical writings seeking to explain relationship between human society and nature. Many of assigned readings are set in the non-Western world. (4)

6500. Archiving Internship. Directed internship at a regional archive. Internship should reflect eight hours of work per week during the semester. (2F,Sp,Su)

6520. Editing Internship. Training in requirements of editorial work in scholarly journals and books. Emphasis placed on editing techniques and mechanics of editorial work. (2F,Sp,Su)

6540. Museum Internship. Directed internship at a regional museum. Internship should reflect eight hours of work per week during the semsester. (2F,Sp,Su)

6560. Professional Internship. Directed internship involving participation in a historical research project for a government agency, corporation, municipality, or some other entity. (2)

6580. Teaching Internship. Involves working with the teacher of an upper-division undergraduate course. Intern prepares, explains, and grades one of the written assignments in the course, as well as completing work required of the undergraduates. Can be repeated once for credit. (2F,Sp,Su) ®

6600. American Studies Theory and Method. Provides students with theory and method of graduate-level research in American Studies. (3F)

6610. Seminar on the American West. Readings and research on topics in the American West. Interdisciplinary focus suitable for graduate students in History and American Studies. (4F)

6620. Seminar in Native American Studies. Readings and research on topics in Native American history and culture. Interdisciplinary focus suitable for graduate students in History and American Studies. (4F)

6630. Studies in Film and Popular Culture. Offered annually on a rotating basis by professors in folklore and English (Cultural Studies, Literature, British and Commonwealth). Topics and theoretical approaches vary, but the primary focus is on feature films. Also taught as Engl 6630. (3F) ®

6700. Folklore Theory and Method. Serves as orientation for new graduate students in folkore. Introduces students to comparative annotation, folklore indices, oral-formulaic theory, performance theory, contextual analysis, and other approaches. (3F)

6710. Regional Folklore. Study of folklore and folklife as a regionalizing process, rather than memorization of cultural contexts of a particular region. Regions examined through their folk culture range. (3F,Sp)

6720. Folklore Fieldwork. Basic methodology class for folklorists and oral historians. Students learn interviewing techniques and other methods for observing and recording the performance of tradition and traditional history. (3F,Sp)

6730. Public Folklore. Provides history and analysis of governmental involvement in protecting, promoting, and otherwise manipulating and utilizing cultural heritage. (3F,Sp)

6740. Folk Narrative. Covers principal narrative genres in folk tradition (myth, tale, legend, ballad) and the basic theories for their analysis and discussion. (3Sp)

6750. Advanced Folklore Workshop (the Fife Conference). Intensive workshop focusing on a topic in folklore. Brings in nationally known experts as lecturers and discussants. Students attend all sessions, then write a critical paper during the summer semester. (3Su)

6760. Cultural and Historical Museums. Examines outdoor cultural and historical museums, examining their function in modern multi-cultural societies. (3Sp)

6770. Seminar in Folklore and Folklife. Conducts close, professional-level study of major areas of folklore and folklife research. (3F)

6800. Paleography. Skills course covering subjects such as technology of writing, interpretation of hands, and mastery of abbreviations. Useful to any student working with old manuscripts, it is essential for those writing theses in medieval or early modern European history. (3)

6820. Writing Scholarly Reviews. Prepares students for writing, editing, and publishing reviews in their chosen discipline. Taught by book review editors at *Western American Literature* and *Western Historical Quarterly.* (3)

6840. Archives Management. Study of management of archival collections. Emphasis on processing and conservation of manuscript and photographic materials. Case studies in identification, processing, and preservation. (3)

6860. Historical Criticism: Practicum. Preparation of critiques for student-presented projects entered into Utah History Fair state-wide competition. Operation of one-day workshop for History Fair finalists. (1-3)

6880. Special Topics: Advanced History Workshop. From teaching values of democracy in public school setting to writing publishable biographies, Department of History sponsors advanced credit workshops on a range of subjects. (1-3) ®

6900. Directed Studies. Standing reading list and exam on a range of subjects. (1F,Sp,Su) ®

6970. Thesis Research. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

Latin Courses (Latn)

1010. Beginning Latin I. Basics of Latin grammar and vocabulary. Beginning readings. (5F)

1020. Beginning Latin II. Intermediate concepts of grammar and vocabulary. Intermediate readings. Prerequisite: Latn 1010. (5Sp)

3100. Intermediate Latin Prose. Readings in Latin prose. Prerequisite: Minimum grade of *C* or higher in Latn 1020. (3Sp)

3130. Intermediate Latin Poetry. Readings in Latin poetry. Prerequisite: Minimum grade of *C* or higher in Latn 1020. (3Sp)

4100. Advanced Latin Readings. Readings in Latin poetry and/or prose. Prerequisite: Minimum grade of *C* or higher in Latn 3100 and 3130. (3F,Sp) ®

Greek Courses (Grk)

1010. Beginning Ancient Greek I. Basics of Greek grammar and vocabulary. Beginning readings. Prerequisite: At least one year of Latin. (5F)

1020. Beginning Ancient Greek II. Intermediate concepts of Greek grammar and vocabulary. Intermediate readings. Prerequisite: Grk 1010. (5Sp)

3300. Intermediate Greek Prose. Readings in ancient Greek prose. Prerequisite: Minimum grade of *C+* or higher in Grk 1020. (3F)

3330. Intermediate Greek Poetry. Readings in Greek poetry. Prerequisite: Minimum grade of *C+* or higher in Grk 1020. (3Sp)

4300. Advanced Greek Readings. Readings in Ancient Greek poetry and/or prose. Prerequisite: Minimum grades of *C* or higher in Grk 3300 and 3330. (3F,Sp) ®

Classics Courses (Clas)

***1100. The Latin and Greek Element in English.** Survey of classical word roots in English, with a view to enhancing students' comprehension of English vocabulary and its Indo-European heritage. (3F)

***3210. Classical Mythology.** Introduces major myths of the Classical world. Explores how these myths serve as keys to understanding the documents and arts of Classical civilization. (3Sp)

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*Taught 1998-99.

**Taught 1999-2000.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Honors Program

Director: *David F. Lancy*
Assistant to the Director: *Robyn E. Daines*
Secretary: *Claudia P. Lewis*
Office in Merrill Library 374, (435) 797-2715

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Undergraduate Program

Overview

Utah State University's Honors Program, established in 1966, provides an enhanced academic environment for highly motivated undergraduates. The Honors Program includes a community of scholars whose curiosity, creativity, and enthusiasm for learning foster educational achievement and personal growth.

Honors offers students intensive seminars, experimental classes, interdisciplinary courses, writing projects, leadership opportunities, and special activities. Members may define independent study programs and design special research projects. Honors students work in close contact with professors in smaller classes; they pursue studies in greater depth than regular classes would allow. Members also enjoy the company of other committed students who encourage and support one another's intellectual growth and productivity. Honors students participate actively in their own education.

Honors serves students who work hard, raise questions, and seek answers. It is designed for students who want to go beyond minimum requirements and narrow specialties. The program benefits those who want to make the most of their university experience.

The Honors program maintains strict standards for both entering and completing its program. However, there are no extra fees to pay, and there are honors options suitable for both entering freshmen and transfer students. The most important criterion for success is a student's motivation and dedication to learning.

Entrance to the Honors Program

A limited number of entering freshmen are invited to join the Honors Program each year. These are students who have been awarded University Club Scholarships, Quinney Scholarships, Sterling Scholarships, Presidential Academic Scholarships, and those who have been named National Merit Finalists or Semi-Finalists.

Other students who are interested in the Honors Program should contact the Honors Office for information about gaining admission.

Students admitted to the program will be eligible to register for Honors classes. Those who plan to complete Honors degrees should plan to take at least one honors course every semester in order to fulfill the degree requirements.

Participation in Honors

To be eligible for entrance into Honors, a student must have a GPA of 3.5. To remain eligible, the student must not allow his/her GPA to drop below 3.5. The Honors Office places students with a GPA of less than 3.5 on probation. If the GPA is not raised to 3.5 after one semester on probation, the student is dropped from the program. Reinstatement can be requested if the GPA is raised to 3.5. Honors students must also register for one honors class per semester in order to remain in the program.

Honors Degrees

Utah State University offers Honors Degrees designed to fill a variety of student needs. Members may work toward one of three degree options:

1. University Honors. Requires 30 semester credits including at least 12 credits from the *Honors Course List* and as many as 15 credits, including Honors senior thesis/project credits, in an upper-division plan of study that has been approved by the Honors Director. University Honors requires a USU cumulative GPA of at least 3.50.

2. University Honors with Department Honors. Requires 30 semester credits including as many as 15 credits from the *Honors Course List* and at least 15 credits, including Honors senior thesis/project credits, in an approved Department Honors Plan. University Honors requires a USU cumulative GPA of at least 3.50.

3. Department Honors. Requires 15 semester credits as specified in a Department Honors plan, including a senior thesis/project.

Listing of Honors Courses

Class offerings change frequently. For the most complete list, see the *Honors Course List* available in the Honors Program office, Merrill Library 374.

Honors Courses (Honr)

BAI 1300H. U.S. Institutions. Provides basic understanding of history, principles, form of government, and economic system of the United States. Open only to students enrolled in USU Honors Program. (3F,Sp)

BSC 1310H. Integrated Science. Focuses on basic scientific concepts and methods of inquiry used by scientists. Considers science from a broad perspective, showing how various disciplines are related. Open only to students enrolled in USU Honors Program. (3F,Sp)

BHU 1320H. Civilization: Humanities. Provides basic understanding of broad range of themes cutting across human history and continuing to be important in contemporary society. Covers both Western and non-Western civilization. Open only to students enrolled in USU Honors Program. (3F,Sp)

BCA 1330H. Civilization: Creative Arts. Explores questions such as: "What is art, and how do you judge it?" and "How does artistic expression vary across cultures?" Covers several forms of art. Students attend concerts, visit gallaries, and attend theatrical performances. Open only to students enrolled in USU Honors Program. (3F,Sp)

BSS 1340H. Social Systems and Issues. Considers how a society of self-interested individuals can live together in peace and harmony. Topic explored from perspectives of different disciplines. Open only to students enrolled in USU Honors Program. (3F,Sp)

2000H. Honors Seminar. Includes orientation to the Honors Program and topics of interest to faculty and students. (1F,Sp) ®

DSC 3010H. Special Topics: Life and Physical Sciences. Focuses on basic scientific concepts and methods of inquiry used by scientists. Considers science from a broad perspective, showing how various disciplines are related. Open only to students enrolled in USU Honors Program. (3F,Sp) ®

DHA 3020H. Special Topics: Humanities/Creative Arts. Humanities section provides basic understanding of a broad range of themes cutting across human history and continuing to be important in contemporary society. Covers both Western and non-Western civilization. In the Creative Arts section, students explore questions such as: "What is art, and how do you judge it?" and "How does artistic expression vary across cultures?" Covers several forms of art. Students attend concerts, visit gallaries, and attend theatrical performances. Open only to students enrolled in USU Honors Program. (3F,Sp) ®

DSS 3030H. Special Topics: Social Sciences. Considers how a society of self-interested individuals can live together in peace and harmony. Topic explored from perspectives of different disciplines. Open only to students enrolled in USU Honors Program. (3F,Sp) ®

3900H. Independent Study. Independent research, library and/or laboratory work, or creative effort working in a one-to-one relationship with a faculty member. Limited to students actively pursuing an Honors degree. (1-5F,Sp,Su) ®

4000H. Reading Seminar. Opportunity to read, discuss, and write about classic books. (1F,Sp) ®

4700H. Honors Fellows. Junior or senior Honors students assist in leading Honors seminars and tutorials. (1-3F,Sp) ®

4800H. Thesis/Project Seminar. Oral presentation and discussion of senior theses/projects. Guest presentations focus on essential contrasts and similarities in "ways of knowing" among various academic specialties. (1Sp)

4900H. Senior Thesis/Project. All Honors students are required to submit a senior thesis/project for graduation with an Honors degree. Thesis/project may be in any area of student's choice, prepared in cooperation with an adviser drawn from the faculty at large. (1-5F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of

Human Environments:

Apparel Merchandising, Interior Design, Consumer Sciences, and Family and Consumer Sciences Education

College of Family Life

Head: Professor *Joan R. McFadden*, housing, household technology, education
Office in Family Life 320A, (435) 797-1558

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WWW http://www.usu.edu/~famlife/humenv/index.html

Professors *Leona K. Hawks*, housing, home furnishings, household equipment, extension; *Jean M. Lown*, consumer and family economics; **Professors Emeritus** Janet E. Preston, family and consumer sciences; *Alison C. Thorne*, family resource management; **Associate Professors** *Jeanette J. Arbuthnot*, merchandising; *Jane L. McCullough*, family resource management; *Tom C. Peterson*, interior design; *Elizabeth Rogers*, interior design; *JoAnn Wilson*, interior design; **Associate Professor Emeritus** *LaRae B. Chatelain*, housing and equipment; **Assistant Professors** *Elizabeth C. Gorham*, family resource management, extension; *M. Michelle Hartzell*, textiles and clothing; **Assistant Professor Emeritus** *Ruth V. Clayton*, clothing and merchandising; **Acting Assistant Professor** *Karen Biers*, clothing and textiles, home based entrepreneurship, extension; **Lecturer** *Brent Windley*, interior design; **Academic Adviser** *Janice H. Moyes*

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Apparel Merchandising; BS and BA in Family and Consumer Sciences; BS and BA in Family and Consumer Sciences Education; BS and BA in Interior Design; Master of Science (MS) in Human Environments; and Human Environments specialization in the Family Life Doctor of Philosophy (PhD)

Graduate specializations: *MS*–Clothing and Merchandising, Consumer Science, Family and Consumer Sciences Education and Extension, Interior Design

Undergraduate Programs

Objectives

The Department of Human Environments offers programs that address human and environmental issues. These programs are accessed through courses that serve departmental majors as well as majors in many other departments on the campus. The four majors in the department lead to careers in merchandising and business, financial counseling, teaching and extension, and interior design. Departmental objectives are aimed to educate students so that upon graduation they will be prepared for a career, prepared to be a contributing citizen, and prepared with knowledge and skills useful throughout their lives. The department also prides itself in the service it provides to students in other departments throughout the University, and strives to design selected courses specifically for nonmajors.

The Department of Human Environments offers four majors: Apparel Merchandising, Family and Consumer Sciences, Family and Consumer Sciences Education, and Interior Design. The Family and Consumer Sciences major has two options, one allowing a specialization and the other requiring a multidisciplinary approach.

Departmental Admission Requirements

Admission requirements for the Department of Human Environments are the same as those described for the University on pages 43-46. Students in good standing may apply for admission to the department.

A 2.5 grade point average is required in the major area. A grade of *C* or better must be earned in all major required courses. Courses required for the major may be repeated only once. *P/D/F* may not be used in major area courses or in supporting courses.

Courses required for the professional component of a program will be accepted if they have been completed within the past ten years. The current instructor of any course for which students need an update will work with students to meet this requirement. To provide a common base of understanding, all majors in the college need to complete FL 1100, Critical Issues in Family Life, listed in the College of Family section of this catalog (see page 80).

Apparel Merchandising Major

A major in this area prepares students for positions in apparel merchandising and related industry and textile careers. It stresses the way fashions begin and are developed, how apparel is marketed, and how fashion businesses are operated. It includes a minor, which may be taken in Marketing, involving coursework in management, marketing, sales promotion, retailing, and entrepreneurial activity.

The Marketing minor is recommended, but not required. An approved minor in another area may be substituted.

The suggested sequence for completing required coursework for the Apparel Merchandising Major, with a Marketing minor, is as follows: (Courses marked with an asterisk must be taken *both* fall and spring semesters.)

Freshman Year: Engl 1010; FL 1100; HEnv 1010*, 1120, 1150, 1750; Psy 1010 or Soc 1010; Math 1050; Phil 2400; Econ 1500; Spch 1050. (30 total credits)

Sophomore Year: Engl 2010; Acct 2010; HEnv 1010*, 2150, 2250, 2260; Econ 2010; USU 1310, 1320, 1330; Breadth Life Sciences (BLS) or Breadth Physical Sciences (BPS); 3 elective credits. (31 total credits)

Junior Year: HEnv 1010*, 3030, 3060, 3160, 4150 or 4160, 4910; MHR 3110; BA 3500. (45-47 total credits) Depth Humanities and Creative Arts (DHA); Depth Life and Physical Sciences (DSC); 3 elective credits. (29 total credits)

Senior Year: HEnv 1010*, 4070, 4250 (4-8 credits), 4150 or 4160, 4190; BA 4510, 4530 or 4540, 4550; 3 elective credits (29 total credits)

Family and Consumer Sciences Major

This major has two options. *Option 1* encourages depth in one or more subject matter areas, and *Option 2* insures breadth. In Option 1, the major may be taken in one or more of the five subject matter areas of the College of Family Life: Consumer Sciences, Clothing and Merchandising, Interior Design, Family and Human Development, and Nutrition and Food Sciences. Option 1 also requires a one-semester internship coordinated with an area of coursework concentration. In Option 2, the major must include a minimum of 6 credits in each of the five subject matter areas: Consumer Sciences, Clothing and Merchandising, Interior Design, Family and Human Development, and Nutrition and Food Sciences. In addition, students may supplement the basic program with coursework or a minor in another area, such as journalism, social work, or business.

Option 1 Example: Family Finance Emphasis

The focus in this emphasis is on Family Finance. Students completing this program will be prepared for careers in family financial counseling or other aspects of family financial management. During the second semester of the sophomore year, and before taking HEnv 2250 or 3460, students must apply and be accepted into this program by a faculty committee in Family and Consumer Sciences. An average GPA of 3.0 is required in HEnv 2300, 2450, 3320, 3340, and 3350. For admission papers, students should contact their adviser.

The suggested sequence for completing required coursework for the Family and Consumer Sciences Major is as follows: (Courses marked with an asterisk must be taken *both* fall and spring semesters.)

Freshman Year: HEnv 1300*; Comm 1000, 1200; Engl 1010; Math 1030 or 1050; BIS 1400, 1550; FL 1100; FHD 1500, 2400; Spch 1050; and USU 1310.

Sophomore Year: HEnv 1300*, 2250, 2300, 2450, 3350, 3410; FHD 3120; Econ 1500, 2010; Engl 2010; Phil 2400; and USU 1320, 1330.

Junior Year: HEnv 1300*, 3320, 3340, 3450, 3460; Soc 3110; Comm 3330; and electives.

Senior Year: HEnv 1300*, 4250, 4330, 4340, 5350; FHD 4220; and electives.

Family and Consumer Sciences Education Major

This major provides professional preparation for teaching Family and Consumer Sciences Education and Occupational Home Economics in public schools, or for employment as a family and consumer scientist in business or government agencies, and extension. Many states, including Utah, require a master's degree to work for extension.

This composite major includes study in nutrition and food sciences, family and human development, interior design, clothing and fashion, and consumer sciences, plus professional education courses.

Student teaching in secondary public schools is required. Internships in extension or business are available.

The suggested sequence for completing required coursework for the Family and Consumer Sciences Education Major is as follows:

Freshman Year: HEnv 1040, 1750, 1780, 2040; FL 1100; FHD 1500, 2400; Engl 1010; Math 1030 or 1050; Psy 1010; Biol 2000.

Sophomore Year: HEnv 2500, 2510, 3320; NFS 1020, 2020, 2250; Chem 1110, 1120; Engl 2010; Breadth American Institutions (BAI). Computer literacy requirement must be met or waived. Students should also register for the child development lab, and apply to secondary education during their sophomore year.

Junior Year: HEnv 2450, 3030, 3300, 3400, 4300, 4400; FHD 3110, 3530, 4550; ScEd 3100, 3200, 4100, 4200; InsT 3000; SpEd 4000.

Senior Year: HEnv 3330, 3350, 5500, 5600; ScEd 5100, 5200, 5300; FHD 4960; NFS 4070.

Interior Design Major

The major in interior design has been developed to prepare students for entry into the profession of interior design. To this end, each student must identify, research, and creatively solve problems pertaining to the function and quality of the interior environment.

An interior designer performs services relative to interior spaces, both commercial and residential. These services include programming, design analysis, space planning, and aesthetics, using specialized knowledge of interior construction, building codes, equipment, materials, and furnishings. Another component of each student's training in interior design is the preparation of drawings and documents relative to the design of interior spaces, in order to enhance and protect the health, safety, and welfare of the public.

The suggested sequence for completing required coursework for the Interior Design major is as follows:

Freshman Year: HEnv 1700 (1 credit), 1750, 1850; FL 1100;

Art 1110, 1120; 9 credits of University Studies Breadth courses; Engl 1010; Quantitative Literacy course, 3 credits.

Sophomore Year: HEnv 1700 (1 credit); HEnv 2260, 2710, 2720, 2730; Engl 2010; 3 credits of Art 2710 or 2720; 6 credits of University Studies Breadth courses; LAEP 1030; and one Art elective.

Junior Year: HEnv 1700 (1 credit); HEnv 3710, 3720, 3730, 3740, 3750, 3760, 3770, 3810, 3830; one Art elective; HEnv 4250 (4 credits) should be taken the summer semester after the junior year.

Senior Year: HEnv 1700 (1 credit); HEnv 3030, 4340, 4740, 4750, 4760; 6 credits of University Studies Depth courses; MHR 2990.

Sophomore Review. In addition to basic undergraduate and graduate requirements set forth in this catalog, students in Interior Design must participate in the Sophomore Review in order to matriculate to junior class standing. The review takes place during spring semester. Students wishing to enroll in junior-level courses must first submit at least two projects from each of the following courses: HEnv 2710, 2720, 2730; Art 1110, 1120; and one elective Art skills class. Students will be provided a space for the display of their projects. The manner in which the work is exhibited is at the discretion of the student and will be considered in the overall evaluation.

An additional component of the Sophomore Review will be an analysis of the student's academic performance. Courses required for sophomore status are: HEnv 1750, 1850, 2710, 2720, 2730; Art 1110, 1120; three credits from Art 2710 or 2720; and one Art skills course. The student's overall GPA will also be used as part of the review process.

Students with a cumulative GPA of 3.0 or above will be automatically advanced to upper-division status following the successful completion of the first portion of this review. Students with a GPA of less than 3.0, who have successfully completed the first part of this review, will be accepted into upper-division courses as space permits, with higher GPAs being considered first.

If a student who has been approved to take upper-division classes stops out of the program, he or she will be readmitted if space is available. Due to space limitations, first preference will be given to students with continuous registration in the program.

Tours. Each year the Interior Design program sponsors a tour to a major design center. Students should plan to take advantage of this opportunity while enrolled in the program.

Additional Information

For more information about Bachelor of Science requirements, the sequence in which courses should be taken, University graduation requirements, and basic professional teaching certification in family and consumer sciences education see the major requirement sheets, available from the Human Environments Department. A listing of course requirements for majors and minors is also available from the department.

For information about changes in requirements or scheduling, students should confer with a departmental adviser. Most of the programs can be tailored to individual student needs with the help of a faculty adviser.

For updated information concerning programs and courses offered by the Department of Human Environments, as well as information on career opportunities, check the departmental web page at http://www.usu.edu/~famlife/humenv/index.html.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the department employs students to assist in research and development.

Each year, the college offers a host of scholarships to undergraduate students who have demonstrated their ability in departmental majors. Applications are available in January from the College of Family Life Dean's Office.

Graduate Programs

Admission Requirements

See general admission requirements (pages 60-61). With permission, MS students may use the Miller Analogies test in lieu of the GRE. In addition, a student without an undergraduate degree in the area to which he or she is applying may be required to complete selected undergraduate courses prior to admission as a fully matriculated graduate student.

Degree Programs

The MS in the Department of Human Environments encompasses a specialization in each of four major areas: Clothing and Merchandising, Consumer Science, Family and Consumer Sciences Education and Extension, and Interior Design. A specialization in Human Environments, with emphases in clothing and merchandising, consumer sciences, and family and consumer sciences education, is offered within the PhD in Family Life.

Specializations

The MS program offers the four specializations indicated above. Plan A (thesis) or Plan B option may be pursued in each MS specialization, and Plan C is available in the Family and Consumer Sciences Education and Extension distance learning specialization. Plan A, Plan B, and Plan C options are described on pages 64-65 of this catalog. All students in the MS program must complete HEnv 6290 (Current Issues in Research).

Clothing and Merchandising. The clothing and merchandising emphasis offers two options: (1) apparel merchandising, and (2) socio/psychological-historical. Both

options can prepare students for teaching, extension, or doctoral programs. Apparel merchandising students may also wish to focus on a business career. Socio/psychological-historical students may also be interested in careers in the museum field. Department courses are offered in fashion theory, behavioral aspects of dress, international apparel and textile trade, research trends, and clothing and merchandising problems, including archaeological/historical textile analysis. Electives allow concentrations in such areas as business, anthropology, sociology, design, and history.

Consumer Science. With an emphasis in consumer science, the MS includes a foundation in management theory and decision-making processes as related to allocation of household resources. Students may focus on family economic issues, consumer problems, or family resource management. The degree could lead to positions in college teaching, social services, consumer affairs, business, family financial counseling, or cooperative extension service.

Family and Consumer Sciences Education and Extension. This course of study is designed to prepare teacher educators to work in family and consumer sciences education. Options for concentration are curriculum/program development or extension. Each option includes coursework in education, family and consumer sciences education, and an area of individual student interest.

The requirements for the options of curriculum/program development and extension may be filled by a 30-credit program with thesis, a Plan B option, or a 33-credit plan including a practicum and a report. The student must have a bachelor's degree in home economics education, and should have had two years teaching experience, or the equivalent experience, in a home economics-related occupation.

Interior Design. The MS degree in Interior Design has two options. One option constitutes a first professional degree, consisting of a three-year program available to candidates with a previous baccalaureate degree in a discipline other than interior design. The option begins with a year-and-a-half of undergraduate coursework and studios designed to form the underpinnings for advanced study. The undergraduate coursework is not applied toward the master's degree program. The second option is an advanced professional degree, consisting of a two-year course of study for students who hold an undergraduate degree in interior design. This option allows outstanding students to pursue additional knowledge in areas of special interest.

Research

Faculty in the department have active, ongoing research projects. Graduate students have the opportunity to participate in many of these projects.

Financial Assistance and Assistantships

Teaching and research assistantships are available from the department and from faculty with funded research projects. The nature of each assignment varies depending on student qualifications and departmental or faculty needs. Applications for assistantships and several scholarships are available through the department. Application deadline for fall semester assistantships is April 1, but applications may be accepted throughout the year.

Human Environments Courses (HEnv)

1010. Apparel Merchandising Professional Development Seminar. Weekly seminars provide orientation to apparel merchandising profession. Exploration of related careers. Invited participation by outside speakers. (0.5F,Sp) ®

1040. Beginnning Clothing Construction. Introductory-level sewing techniques and the use and care of sewing machines and sergers. Waiver exam available. No previous sewing experience needed. (3F)

1120. Introduction to Apparel Merchandising. Investigation of the components and language of fashion, including an analysis of the apparel industry and the career opportunities therein. Lecturers may include guest speakers from the industry. (3F)

BSS 1150. Diversity in Culture and Dress. Culture and dress examined from interdisciplinary and cross-cultural perspective, with focus on diversity and social changes. Cultures include India, Africa, Asia, Europe, North and South America, and the Pacific Islands. (3F,Sp)

1300. Family Financial Management Professional Development Seminar. Weekly seminars providing orientation to family financial management services and related careers. Invited participation by outside speakers. Repeatable for up to 4 credits. (0.5F,Sp) ®

1700. Interior Design Professional Seminar. Weekly seminars to provide an orientation to the professional aspects of interior design. Exploration of related careers and professional societies. Invited participation by outside speakers. Repeatable for up to four credits. (0.5F,Sp) ®

BCA 1750. Design in Everyday Living. Investigation of the basic elements and principles of design related to everyday living experiences and the practical application of relevant theory. (3F,Sp,Su)

1780. Introduction to Housing and Interior Design. Exploration of housing environments, types, space allocations, and current trends. Explores basic philosophy of interior design. Analyzes design elements and principles when applied to interior spaces. (3F,Sp)

BCA 1850. Design Theory. Contemporary and historic design theories as factors influencing design. Evaluation of current design trends. (2Sp)

2040. Intermediate Clothing Construction and Alterations. Intermediate-level clothing construction techniques, pattern alteration and fitting, and use of sewing machine and serger. Previous sewing experience required. Prerequisite: HEnv 1040. (3Sp)

2150. Elements of Wardrobe Management. Professional wardrobe selection and care for men and women, based on lifestyle, personality, body type, individual needs, and principles of design, to enhance self-presentation in business and social contexts. Includes cost and quality analysis of ready-to-wear. (3F)

2250. Study Practicum in Human Environments. Introductory-level experience in study practicum or internship position approved by the department. One credit for every 75 hours of experience. Sophomore standing required. Student may recieve a *maximum* of 4 credits. (1-4F,Sp,Su) ®

QI 2260. Quantitative Methods in Human Environments. Application of mathematics and geometry to merchandise control and specification/cost calculations specific to careers in human environments. Prerequisite: Choose one of Math 1030, 1050, or Stat 1040. (3F,Sp)

BSS 2280. Family Economics: Gender, Family, and Work Roles. Examination of socialization of females and males for their roles in American society. (3F,Sp)

2300. Introduction to Family Financial Management Services Careers. Explores career opportunities in personal and family financial management services. (1F)

2340. How to Buy a House. Easy-to-access Internet course explaining the steps required to buy a house. Student comprehension assured by assignments accompanying interesting study materials. For students needing information or assistance with special assignments, contact provided with extension housing specialist in Human Environments Department. (1F,Sp,Su)

2450. The Consumer and the Market. Explores how the marketplace operates, including factors influencing consumer purchases, current consumer problems, and assistance provided to consumers by federal and state agencies, businesses, and other organizations. (2F,Sp)

2500. Family and Consumer Sciences Education Professional Development Seminar. Provides an orientation to the professional aspects of Family and Consumer Sciences Education. Enables exploration of related careers, exposure to practicing Family and Consumer Sciences Education professionals, current research reports, field trips, and career development. One credit required. Repeatable for up to two credits. (0.5F,Sp) ®

2510. Concepts of Family and Consumer Sciences Education. Introduction to concepts needed for teaching in secondary Family and Consumer Sciences Education programs. Gives an overview of current trends in Family and Consumer Sciences. (3F)

2710. Architectural Graphics I. Competency development in use of drafting tools, symbols, and techniques used in interior design presentation. Includes communication skills related to techniques and approaches to graphic presentations of interior design solutions: floor plans, elevations, sections, axonometrics, details, and dimensioning. (4F)

2720. Architectural Graphics II. Introduction to three-dimensional drawing: isometric and perspective. Development of methods of rapid graphic communication techniques and approaches to complete professional presentations. Exploration of various types of media and presentation methods. Prerequisite: HEnv 2710. (4Sp)

2730. Interior Space Planning and Human Dimensions. Focuses on physical, psychological, and human factors influencing design of interior space. Includes research, programming, analysis, and design of residential and nonresidential spaces. Prerequisite: HEnv 2710. (4Sp)

2810. Color Theory. Physical and psychological attributes of color. Review of color systems and the impact of color on the design process. Prerequisite: HEnv 1750. (2Sp)

DSC 3030. Textile Science. Study of fibers, yarns, fabric constructions, and finishes as related to appreciation, selection, use, and care of current textiles. Evaluation of physical, economic, and aesthetic properties of textile products to determine suitability for desired end use. (4F,Sp)

3040. Flat Pattern Design and Clothing Construction. Flat pattern clothing design and fitting methods. Construction of student-designed garments. Student-purchased supplies necessary. Prerequisites: HEnv 1040, 2040. (3F)

DSS, CI 3060. Human Behavior Related to Dress. Analyzes economic, historic, psychological, social, and cultural contexts shaping individual and group dress and appearance. Contrasts Western with non-Western societies with respect to cultural change and ambivalence, ideologies, appearance-modifying commodities, interpretation of symbolic ambiguity, and negotiations of meanings of appearance. Prerequisites: HEnv 1150, and Soc 1010 or Psy 1010. (3F)

3160. Visual Merchandising and Display. Evaluation and design of store layouts, along with merchandise presentation and display. Prerequisite: HEnv 1750. (2Sp)

3300. Family and Consumer Sciences Education Clinical Experience I. Provides on-site experience for students to model a secondary family and consumer sciences education teacher. Students expected to learn teaching and classroom management principles. Must be taken concurrently with HEnv 3400. Prerequisite: Admission to Secondary Education Professional Education Component. (1F)

3320. Management and Decision Making. Study of the roles of personal and family goals in the use of resources, factors affecting decisions about the use of resources, and relationship of household resource use to the surrounding environment. (2F)

3330. Residential Technology. Consumer evaluation, operation, use, and care of household equipment, including performance, energy efficiency, materials, construction, quality, and financial investment. (3Sp)

DSS 3340. Housing: Societal and Environmental Issues. Studies housing in the contemporary U.S., including affordability, access, expectations, aesthetic considerations, and effects of public and private policies on housing choices. (3F)

DSS, QI 3350. Family Finance. Achieving personal and family financial goals, including financial planning and record keeping, different types of insurance, taxes, use of credit, investments, retirement, and estate planning. Prerequisites: Choose one of Math 1030, 1050, or Stat 1040. (3F,Sp)

3400. Family and Consumer Sciences Education Special Methods I. Methods of successfully planning and maintaining family and consumer sciences work education programs in secondary schools. History and philosophy of applied technology education. Prerequisite: Admission to Secondary Education. HEnv 3400 and 3300 must be taken concurrently. (3F)

3410. Family Financial Management Software. Comparison and evaluation of selected software programs available for personal financial management. Prerequisites: HEnv 3350; choose one of Math 1030, 1050, or Stat 1040. (2Sp)

3450. Consumer Credit Problems. Consumer credit problems, debt reduction strategies, credit collection policies and practices, bankruptcy, and government assistance programs. Prerequisite: HEnv 3350. (2Sp)

3460. Financial Counseling. Assessment of variety, range, and complexity of personal and family financial problems. Development of diagnostic and communication skills to assist individuals and families of diverse ethnic and socioeconomic groups in resolving their financial difficulties. Prerequisite: HEnv 3350. (3F)

3600. Seminar: FCS Education. Taken in conjunction with HEnv 4600 to complement introductory student teaching experience. Focuses on information necessary for beginning teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. Prerequisite: Admission to Secondary Education. (1Sp)

3710. Computer Aided Drafting and Design I. Introduction to computer aided drafting and design for design students. Prerequisite: BIS 1400 or passing grade on Computer and Information Literacy exam. (3F)

3720. Computer Aided Drafting and Design II. Advanced exploration and study of computer aided design, emphasizing color theory, creative applications and proficiencies. Prerequisite: HEnv 3710. (3Sp)

3730. Interior Materials and Construction. Identification of current interior materials; their characteristics, use, and care. Experience in specification estimation, workroom procedures, and development of a working resource file. Prerequisite: HEnv 2730. (3F)

DHA 3740. History of Interior Furnishings and Architecture I. Identification of historical architectural styles and elements in interior furnishings and materials, dating from ancients, middle ages, Italian renaissance, the Hispanic periods, the French periods, and the English period. (3F)

DHA, CI 3750. History of Interior Furnishings and Architecture II. Identification of historical architectural styles and elements in interior furnishings and materials, including the American period, Victorian through the present. (3Sp)

3760. Residential Design Studio. Studio projects of various complexity and type, having residential focus. Analysis of various approaches to problem solving. Graphic and verbal presentation, emphasizing high-end design evaluation. Prerequisite: HEnv 2730. (3F)

3770. Commercial Design Studio. Studio projects of various complexity and type, having commercial focus. May include hospitality, retail, medical, office, and other commercial and institutional design opportunities. Prerequisite: HEnv 3760. (3Sp)

3810. Interior Lighting. Lighting design, including types, techniques, and application of lighting for user needs in residential and commercial spaces. Prerequisite: HEnv 3760. (2Sp)

3830. Architectural Systems. Study of architectural systems in contemporary buildings. Investigation of construction drawings and their interpretation. Includes related codes and professional terminology. (3Sp)

4040. Couture and Tailoring Methods. Advanced clothing construction techniques. Construction of tailored wool jacket or coat. Construction of garments using couture design and construction procedures. Student-purchased supplies necessary. Prerequisite: HEnv 3040. (3Sp)

CI 4070 (d6070).[1] Merchandising Management Strategies and Entrepreneurship. Application of effective textile and apparel merchandising strategies for businesses, both entrepreneurial and large retail organizations. Prerequisite: HEnv 1120 or consent of instructor. (3F)

4110. Computer Aided Apparel Design. Utilization of computer technology and creative sources to design apparel. Prerequisite: HEnv 3040. (3Sp)

***DHA 4150 (d6150). History of Textiles and Apparel I.** Tracks political, economic, technological, artistic, cultural, and social factors associated with origin, adoption, and abandonment of dress and appearance styles of men and women in western civilization from prehistoric times through the sixteenth century. Emphasizes ideas and critical thinking. (3Sp)

****DHA 4160 (d6160). History of Textiles and Apparel II.** Tracks fashion changes in textiles and apparel for men and women in Western Europe and North America from the seventeenth century to the present. Analyzes past influence on present fashions. Includes designs of famous apparel designers. Evaluates authenticity of costumes in films. (3Sp)

CI 4190 (d6190). Current Issues in Textiles and Apparel. Investigation of current issues confronting retailers, manufacturers, and designers of textile and apparel products. Focuses on domestic and international operations. Includes fashion trend analysis. (3Sp)

4240. Topics in Human Environments. Current topics associated with human environments. Prerequisites: Approval of instructor and junior standing.(3F,Sp,Su)®

4250. Advanced Internship. Midmanagement-level experience in a position approved by the department. One credit for each 60 hours of experience. Prerequisite: Junior standing. (1-8F,Sp,Su) ®

4300. Family and Consumer Sciences Education Clinical Experience II. Provides on-site experience for students to model a secondary family and consumer sciences education teacher. Students expected to learn teaching and classroom management principles. Prerequisites: HEnv 3300, 3400. (1Sp)

4330. Family Financial Management Services Career Seminar. Exploration of career options through readings, guest lecturers, interviews of practitioners, and development of an internship and career plan. Prerequisites: HEnv 3350, 3460. (1F)

4340. Housing: Finance. Exploration of mortgage loan industry with in-depth examination of various mortgage loan products and procedures. Study of loss mitigation strategies for mortgage default situations. (2F)

4400. Family and Consumer Sciences Education Special Methods II. Development of competency in curriculum planning, and skill and sensitivity in the use of various teaching-learning strategies and resources. Includes assessment for vocational education. Prerequisites: HEnv 3300, 3400. (3Sp)

4600. Introductory Student Teaching Experience. On-site experience modeling secondary family and consumer sciences education teacher. Development of teaching and classroom management principles. Prerequisite: HEnv 3400. (4sp)

4630. Family and Consumer Sciences Assessment. Principles and techniques for developing useful measures of student achievement, interpreting test results, and reporting evaluations. Prerequisite: Concurrent enrollment with HEnv 4400. (2F)

4730. Design Detailing. Detailing of interior components. Preparation of detail drawings for use by the trades for interior components. Student develops construction documents and prepares scale model for senior exhibit. (3Sp)

CI 4740. Business and Professional Practices in Interior Design. Overview of business practices and principles for interior design, including: salesmanship, marketing, client and trade relationships, establishing an interior design practice, and fee structure. (3Sp)

4750. Senior Project Design Studio I. Study of AIA Interior Design Contracts A271, B171 with submittals for all design phases. Emphasis on a creative design solution for a commercial remodeling project with senior level of detailing, and research for construction documents and CSI format specification manual. Prerequisites: Senior ranking in Interior Design and HEnv 4730. (3F)

4760. Senior Project Design Studio II. Continuation of HEnv 4750, with research of a professional interest area and incorporation of an original sustainable design element in the HEnv 4750 project. Emphasizes sustainable design, creative problem solving, and specification skills. Prerequisite: HEnv 4750. (2Sp)

4770. Senior Exhibit. Analysis and review of student work in preparation for formal exhibition. (1Sp)

4900. Independent Study in Human Environments. Before registering, students must identify a project or topic of interest and discuss with instructor. Prerequisite: Junior standing and approval of faculty. (1-5F,Sp,Su) ®

4910. Creative Projects. Research project or practicum conducted under direction of faculty member. Topic may be initiated by student or faculty. Prerequisites: Junior standing and approval of faculty. (1-4F,Sp,Su) ®

5210. Introduction to Software Usage. Basic operating system usage, and word and graphic processing for VAX, IBM compatibles, and MacIntosh systems. (1F)

5350. Advanced Family Finance. Managing personal and family financial resources to achieve goals relating to investments, retirement, and estate planning. Prerequisite: HEnv 3350. (3Sp)

5500. Student Teaching Seminar. Taken during student teaching in secondary schools to complement school experience. Focuses upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. Prerequisites: HEnv 4300, 4400. Must be taken concurrently with HEnv 5600. (2F)

5550. Workshop Topics in Human Environments. Concentrated offerings to increase knowledge, skills, or creative expression in current topics or curriculum. (1-3Su) ®

5600. Student Teaching in Secondary Schools. After assignment to cooperating family and consumer sciences educator, students are given professional responsibilities associated with teaching. Prerequisites: HEnv 4300, 4400. Must be taken concurrently with HEnv 5500. (8F)

***6020. Fashion Theory.** Analyzes research related to historical, sociological, psychological, marketing, and economic concepts and theories related to fashions. Applies current theories and methodologies to study of selected topics within the field of fashion, such as apparel, interiors, and theater. (3F)

6030. Textile Science. Evaluation of the physical, economic, and aesthetic properties of textile products. Students develop individual textiles research project. Repeatable for up to 4 credits. (1-4) ®

6050. Advanced Topics in Clothing, Merchandising, and Apparel Design. Investigative approach to selected themes related to current or historical topics in clothing, merchandising, and/or apparel design. (1-3F,Sp,Su) ®

6060. Human Behavior Related to Dress. Students critique and summarize current research on individual topics and present their summaries to the class. (3F)

6070 (d4070). Merchandising Management Strategies and Entrepreneurship. Application of effective textile and apparel merchandising strategies for businesses, both entrepreneurial and large retail organizations. Prerequisite: HEnv 1120 or consent of instructor. (3F)

****6120. International Textile and Apparel Trade.** Discussion of trade theory, including globalization system, and exploration of significant factors contributing to exchange of apparel and textile goods in the world market. (3Sp)

***6150 (d4150). History of Textiles and Apparel I.** Tracks political, economic, technological, artistic, cultural, and social factors associated with origin, adoption, and abandonment of dress and appearance styles of men and women in western civilization from prehistoric times through the sixteenth century. Emphasizes ideas and critical thinking. To receive credit for 6150, graduate students study structure and design of historic garments and textiles and use the historical method of research to investigate individual topics. (3Sp)

****6160 (d4160). History of Textiles and Apparel II.** Tracks fashion changes in textiles and apparel for men and women in Western Europe and North America from the seventeenth century to the present. Analyzes past influence on present fashions. Includes designs of famous apparel designers. Evaluates authenticity of costumes in films. To receive credit for 6160, graduate students study purposes and function of historic textiles and apparel collections, and techniques for maintenance, storage, and date identificaion of historic textile products. (3Sp)

6190 (d4190). Current Issues in Textiles and Apparel. Investigation of current issues confronting retailers, manufacturers, and designers of textile and apparel products. Focuses on domestic and international operations. Includes fashion trend analysis. To receive credit for 6190, graduate students research a foreign country and write a formal paper comparing the U.S business environment with that of the selected country; oral presentation of findings also required. (3Sp)

6200. Master's Seminar in Human Environments. Course objectives will be unique each time course is offered. Repeatable for up to 3 credits. (1-3F,Sp) ®

6210. Using and Interpreting SPSS to Analyze Social Research Data. Explores use of SPSS for descriptive statistics, contingency tables, ANOVA models, and multiple regression. Discussion of syntax, procedure options, and interpretation of output. (2Sp)

6240. Graduate Topics in Human Environments. Survey of selected topics in human environments. Topic will be unique each time course is offered. (1-3F,Sp,Su) ®

6250. Graduate Internship in Human Environments. For graduate students who wish to acquire or upgrade their experience in an occupational field related to their area of study. One credit per 60 hours of experience. Repeatable for up to 6 credits. Prerequisite: Instructor approval prior to enrollment. (1-6F,Sp,Su) ®

6280. Research Methods in Human Environments. Techniques and tactics in designing and analyzing social science human behavior research. Emphasizes designs and instrumentation. Prospectus required. (2F)

6290. Current Issues in Research. Investigation and reporting of current issues related to human environments research. (3F)

***6330. Consumer Problems.** Covers history of U.S. consumer movement, national and international consumer issues, sources of consumer research and information, roles of consumers, business and government in development and implementation of consumer regulations, and emerging consumer issues. (3F)

6340. Housing: Societal and Environmental Issues. Problems related to housing in the contemporary U.S., including affordability, access, expectations, aesthetic considerations, and the effects of public and private policies on housing choices. (3F)

****6360. Family Resource Management.** Use of resources by families to achieve their economic and social goals. Topics include management theories, changes in resources available to families, current problems in resource allocations within the household, and evaluation of information related to these topics. (3F)

***6420. Family Economics.** Identifies alternative measures of family economic well-being, theories of family economic behavior, and income and wealth distribution related to demographic characteristics. Explores government policies, both national and international, that affect economic well-being. (3Sp)

****6430. Family Financial Problems.** Reviews research on family financial problems, including unemployment, credit, bankruptcy, relationship of financial problems to emotional distress, and sources of assistance for financial problems. (3Sp)

6500. Family and Consumer Sciences Education Colloquium. Survey of current research and problems. (1-3F,Sp) ®

6520. Administration and Supervision in Family and Consumer Sciences Education and Leadership Development. Application of research and theory of administration and supervision to define and clarify the role of leadership in Family and Consumer Sciences Education. (3Sp)

6530. Classroom Management, Student Motivation, and Guidance. Multiple strategy approach for increasing teachers' effectiveness and satisfaction in family and consumer sciences classroom management and discipline. (3Sp)

6540. Curriculum Development, Testing, and Evaluation. Examines current trends in curriculum development and special programs related to specific educational programs. Includes field testing of curriculum for use in family and consumer sciences education at the secondary school level. (3Sp)

6550. Teaching Techniques and Materials Topics. Explores timely topics in field of family and consumer sciences education, including human sexuality and current perspectives. (3F,Sp,Su) ®

6570. Adult Education and Volunteer Programs. Explores current program formats and instructional materials developed for adult education. Emphasizes program and course development and teaching strategies suitable for adults. (3F)

****6710. Computer Applications of Modeling in Interior Design.** Application of software to produce a video model of interior spaces, using “3-D Studio” and “Animator Pro.” Prerequisite: HEnv 3720. (3F)

6750. Readings in Interior Design. Readings about the creative process, post-occupancy evaluation, culture and environment, and design forecasting. Repeatable for up to 2 credits. (0.5F,Sp) ®

***6770. Facilities Planning and Management.** Facilities management process in large-scale organizations. Formation of facilities policies, procedures, and standards. The facilities data base, space allocations, and management process. (3Sp)

****6780. Design Methodologies in Interior Design.** Identifies and defines various design methodologies, with regard to design solutions for interior environments. (3F)

6900. Independent Study in Human Environments. Independent study in the areas of human environments, including clothing and merchandising, consumer sciences, family and consumer sciences education, and interior design. Check with committee for approval of project and allowable credit hours. (1-4F,Sp,Su) ®

6970. Master's Thesis Research in Human Environments. Repeatable for up to 6 credits. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7200. Research Seminar. Provides opportunity for investigation and reporting of student-selected problems. Repeatable for up to 3 credits. Prerequisite: HEnv 6290. (1-3) ®

7220. Theory in Human Environments. Identification, status, and application of theories and theory development in human environments. Prerequisite: HEnv 6290. (3)

7240. Advanced Topics in Human Environments. Major topics and issues in the study of human environments. Prerequisite: HEnv 6290. (3) ®

7250. Advanced Graduate Internship. Professional supervision of doctoral students applying and interpreting general principles from the study of and research in human environments. One credit for every 60 hours experience. Repeatable for up to 4 credits. Prerequisite: HEnv 6290. (2-4F,Sp,Su) ®

7260. Research Topics in Human Environments. Critical review and evaluation of research in the study of human environments. Prerequisite: HEnv 6290. (3) ®

7270. Theoretical Frontiers. Indentification, status, and application of theories and theory development in area of specialization. Prerequisite: HEnv 7220. (3)

7500. Leadership in Vocational Education. Supervision and leadership theory with practical application to roles of vocational educators as leaders, as supervisors, and as administrators in educational programs, cooperative extension, and similar settings. (3)

7560. Supervision Practicum. Directed activities in curriculum development and supervision in the public schools. (1-6)

7900. Independent Study. Independent study in the areas of human environments, including clothing and merchandising, consumer sciences, and family and consumer sciences education. Repeatable for up to 6 credits. Prerequisite: Instructor's permission. (1-6F,Sp,Su) ®

7970. Dissertation Research. Repeatable for up to 20 credits. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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*Taught 1998-99.

**Taught 1999-2000.

[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Industrial Technology and Education

College of Engineering

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Professor *Jay C. Hicken*, technology education, wood technology, power/energy/transportation; **Associate Professors** *Kurt Becker*, technology education, construction technology, computer aided drafting; *Ward P. Belliston*, electronics/computer technology; *Reed M. Nielsen, Jr.*, welding engineering technology; *Gary A. Stewardson*, technology education, manufacturing technology; *David P. Widauf*, aviation technology; **Assistant Professor** *Jacqueline R. Luedtke*, flight technology; **Senior Lecturer** *Charles B. Larsen*, aviation maintenance; **Lecturers** *Mark R. Baugh*, welding engineering technology; *James Stocks*, computer aided drafting

Degrees offered: Bachelor of Science (BS) in Industrial Teacher Education, BS in Industrial Technology, Associate of Applied Science (AAS) in Aeronautics (Aviation Maintenance), AAS in Drafting, Master of Science (MS) in Industrial Technology

Undergraduate emphases: *BS in Industrial Teacher Education*–Technology Education and Trade and Technical Education; *BS in Industrial Technology*–AeroTechnology, Electronics/Computer Technology, Flight Technology, and Welding Engineering Technology; *AAS in Aeronautics*–Airframe and Powerplant Technician

Undergraduate Programs

Objectives

The Department of Industrial Technology and Education offers professional programs to prepare students to function as technologists in a variety of technical specialities. The department values the integration of academic knowledge with hands-on technical skills. This is achieved by emphasizing the application of scientific and technological principles in extensive laboratory activities. The department strives to ensure that all graduates will obtain employment to match their interests and preparation.

The **Industrial Teacher Education** programs prepare graduates to teach in public schools, applied technology centers, and community colleges. **AeroTechnology** graduates fill aviation maintenance management positions in government and industry. **Electronics/Computer Technology** graduates fill technical positions in the electronic and computer industries. The **Flight Technology** curriculum prepares graduates to be professional pilots. **Welding Engineering Technology** graduates fill technical/management positions in the construction and fabrication industries. The **Aviation Maintenance (A&P)** program provides training and FAA licensing for graduates to perform maintenance and repairs on aircraft. The **Drafting** program teaches design and computer skills for graduates to work successfully in a variety of drafting fields.

Admission Requirements

Admission requirements are commensurate with those outlined for the University. See pages 43-46 in this catalog.

Professional Technology Program (PTP)

The Professional Technology Program (PTP) applies to the AeroTechnology, Electronics/Computer Technology, Flight Technology, and Welding Engineering Technology specializations. The purpose of the program is to provide a quality education for students by requiring that they be fully prepared for upper-division coursework by having satisfactorily completed all required pre-professional courses.

Enrollment in upper-division ITE courses (3000-level and above) is available only to students who have been accepted into the PTP or into an appropriate graduate program or to students with a non-ITE major requiring a specific class.

To be eligible to apply for admission to a professional program, a student must be in good academic standing in the University and college, must achieve a grade of *C*- or better in every required preprofessional course, and must have an overall grade point average of 2.0 in required preprofessional coursework completed at USU.

Eligible students must apply for admission to the PTP during the semester in which they are completing the required preprofessional courses.

For all technology majors in the Professional Program, the following academic regulations apply in addition to University regulations:

1. A minimum GPA of 2.0 must be maintained in technology/math/science/business courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and University Studies (General Education) courses are not included in this GPA calculation.

2. No more than 6 hours of *D* or *D*+ credit may be applied toward meeting graduation requirements in technology/math/science/business classes.

3. College of Engineering courses may be repeated only once. Audits count as a time taking a class unless prior written approval is obtained from the department head. A maximum of three required or elective courses completed as part of a Professional Program can be repeated in order to meet graduation requirements. (Courses completed as part of a preprofessional program are not included in this total of three repeats.)

4. The *P-D-F* grading option may not be used in required or elective courses completed as part of a Professional Program. (The *P-D-F* grading option is approved for University Studies or General Education courses.)

5. The academic regulations listed above (1-4) apply to required coursework and any technology/math/science/business course which could be used to satisfy graduation requirements for the chosen degree. That is, once a student completes a particular technical elective, it becomes a required course for that student.

6. Students in violation of departmental or college academic regulations, no longer eligible for graduation, or not making satisfactory progress toward a degree, will be placed on probation.

a. Students will be placed on probation if they (i) earn an *F* in a technology/math/science/business course which could be used to satisfy graduation requirements for the chosen degree (see item 5 above); (ii) have more than 6 hours of *D* credit (see item 2 above); or (iii) have a GPA of less than 2.0 (see item 1 above).

b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 6 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a semester GPA of 2.0 or higher in technology/math/science/business classes and must not earn any *D*'s or *F*'s.

While on probation, a student may not preregister. The student's major code will be changed to a preprofessional code. The student must meet at least once per semester with the college academic adviser to work out a schedule having the primary goal of correcting the existing academic problems.

Requirements

Bachelor of Science in Industrial Teacher Education

Technology Teacher Education. This option prepares the student to teach in junior and senior high schools. The curriculum requirements include the following: ITE 1000, 1010, 1020, 1030, 1040, 1200, 2030, 2300, 3020, 3030, 3050, 3200, 3220, 3300, 3650, 4300, 4400, 4440, 4650, 5220, 5240, 5500, 5600; Math 1050, 1060; Engr 1010; InsT 3000; ScEd 3100, 3200, 4100, 4200, 5100, 5200, 5300; SpEd 4000; Engl 1010, 2010. Students are also required to complete a technical option (either ITE 1640 and 1660, *or* ITE 4200). Students in this degree also take University Studies (General Education) courses and electives. See major requirement sheet, available from the department, for further information.

Trade and Technical Teacher Education. This option prepares the student to teach applied technology education courses at the high school or post high school level. The curriculum requirements include the following: basic and advanced technical and trade courses, 43 credits; professional courses, 26 credits, including InsT 3000, ITE 3200, 3300, 3900, 3930, 4300, 4400, 4700, 5220, 5910, SpEd 4000; University Studies (General Education), 30 credits; technical and general electives, 24 credits; Engl 1010, 2010; and Math 1050.

State certification requires a minimum of two years of approved vocational experience. Successful completion of a trade competency examination is accepted in lieu of vocational experience.

Bachelor of Science in Industrial Technology

AeroTechnology Specialization. Graduates of the AeroTechnology program are qualified to enter the work force in many rewarding career fields in aviation. Employment opportunities exist in target industries such as major airline carrier maintenance management, commuter airline maintenance management, fixed-base operator (FBO) maintenance, and Federal Aviation Administration (FAA) aircraft inspection after some field experience. The program has a great deal of depth in general maintenance, which applies to most industrial maintenance operations. Although the program's focus is aviation, the knowledge and skills gained can be used in other fields.

The courses for the **AeroTechnology** specialization are as follows: ITE 1030, 1100, 1130, 1140, 1170, 1200, 1240, 2100, 2110, 2140, 2150, 2170, 2180, 2190, 2200, 2300, 2420, 2430,

2440, 3010, 3120, 3280, 3610, 3820, 4200, 4310, 4490, 4580, 4610, 4620; Math 1050, 1060, 1100; Phyx 1800; Stat 2300; Engl 1010, 2010; MHR 3110, 3710; and Engr 1010. Students in this degree also take University Studies (General Education) courses and electives. See major requirement sheet, available from the department, for further information.

Students in the AeroTechnology program must also complete 9 credits of technical electives. At least 8 credits must be in upper-division courses. Technical electives include: ITE 2310, 2360, 2370, 2400, 3400, 3410, 3820, 4250, 4310; BA 3700, 4720. Completion of the FCC Avionics license will require more than the 126 credits for graduation.

Electronics/Computer Technology Specialization. Students choosing the Electronics/Computer Technology specialization are trained for positions in industry as liaison technologists between the design engineer and production personnel. These positions are available in field engineering, test engineering, quality control engineering, and design engineering, to mention a few. Networks and LAN management are also emphasized.

The courses for the **Electronics/Computer Technology** specialization are as follows: ITE 1030, 1200, 2240, 2300, 2310, 2320, 2360, 2370, 2400, 3030, 3380, 3390, 3400, 3510, 3710, 4710, 4720; CS 1700, 1710, 1720; Engr 1010; Chem 1110; Math 1050, 1060, 1100; Phyx 1800; Stat 2300; Engl 1010, 2010; and BIS 5200. Nine credits of upper-division technical electives are also required. See the adviser for details. Students in this program also take University Studies (General Education) courses and electives. See major requirement sheet, available from the department, for further information.

The **Flight Technology** specialization prepares graduates to be commercial pilots. The degree requirements include completion of the following FAA licenses: private, instrument, commercial, CFI, CFII, and Multi-Engine. The courses for this specialization are as follows: ITE 1100, 1130, 2170, 2180, 2300, 2330, 2350, 2430, 2510, 2520, 2540, 2620, 2660, 2720, 2740, 2860, 2880, 3010, 3120, 3140, 4260, 4280, 4480, 4490, 4660; Math 1050, 1100; Bmet 2000, 3250; Engl 1010, 2010; Engr 1010; Phyx 1800; and MHR 3110. Also 21 credits of University Studies (General Education) classes and 13 credits of other electives (upper-division courses) need to be taken to fulfill requirements for graduation.

In addition, a Management MHR Minor is required for this major. Required courses are listed below. The College of Business requires students to have a cumulative GPA of 2.5 to be admitted to these courses. MHR 3110 is required and must be taken early in the program. In addition, four courses must be selected from the following: MHR 3710, 3720, 3810, 3820, and 4720.

Welding Engineering Technology Specialization. Utah State University offers one of the few BS degree programs in the nation in Welding Engineering Technology. Students choosing this program of study are trained for entry-level positions in the industrial setting as welding engineers, welding engineering technologists, welding technologists, quality assurance technologists, or manufacturing technologists. They are prepared to work in field construction, light and heavy shop fabrication, and in manufacturing/production. They are trained in new process development, code and noncode high-quality applications, problem solving, technical sales, inspection, and estimating.

The courses for the **Welding Engineering Technology** specialization are as follows: ITE 1030, 1200, 1640, 1660, 2300, 2310, 2670, 2850, 3030, 3060, 3090, 3230, 3630, 3670, 3810, 3820, 4200, 4310, 4580, 4810, 4820, 5750, 5760, 5890; Engr 1010; Math 1050, 1060, 1100; Chem 1110, 1130; Engl 1010, 2010; BA 3700; MHR 3110, 3710; Stat 2300, 5300; and Phyx 1800. In addition, students in this program must also take University Studies (General Education) courses and electives. See major requirement sheet, available from the department, for further information.

Associate of Applied Science Vocational-technical Programs

The two-year curricula develop strong technical skills in one of two areas of specialization—aeronautics or drafting. Most of the credits earned in these programs may be applied toward a related BS degree should the student decide to continue his or her education.

Aviation Maintenance (A&P) Technician Associate of Applied Science Degree Program. The two-year technical program leads to either an Associate of Applied Science (AAS) degree or a certificate. Required courses are: ITE 1030, 1130, 1140, 1170, 1200, 1240, 2100, 2110, 2140, 2150, 2170, 2180, 2190, 2200, 2300, 2420, 2430, 2440, 3280, 4200; Math 1050, 1060; Phyx 1800; and Engl 1010.

In addition, students must complete University Studies (General Education) requirements for the AAS degree, as described in the general University requirements. Federal Aviation Administration airframe and powerplant certification is available without University Studies (General Education) requirements. See requirement sheet, available from the department, for further details.

Drafting Technology Two-year Associate of Applied Science Degree Program. A two-year technical drafting and design program leading to an AAS degree is available to those desiring to directly enter the drafting and design occupation. The program emphasizes computer aided drafting and design. Curriculum requirements include the following: ITE 1010, 1030, 1040, 1200, 2300, 2320, 3220, 3230, 3240, 3270, 4930; Engr 1010; Math 1050; and Engl 1010. Students in this program also fulfill University Studies (General Education) requirements and complete technical electives and other electives. See requirement sheet, available from the department, for further details.

Graduate Programs

The Master of Science (MS) degree is available to individuals interested in graduate study. Programs are offered in Industrial Teacher Education and Technology. Candidates can choose either the Plan A thesis option or the Plan B nonthesis program.

Admission Requirements

See the general admission requirements for graduate study in this catalog (pages 60-61). Students applying for admission to the MS program must complete the GRE with a minimum quantitative and verbal score of 1,000 and a 40th percentile

minimum score on the verbal and quantitative tests or must complete the MAT with a minimum score of 43. Admission committees also consider experience, undergraduate record, and formal recommendations.

MS Degree

The MS program offers a general technology degree, with one specialization in Technology Education. A Plan A or Plan B option is available in each. The Plan A and Plan B options are described on pages 64-65 of this catalog.

Industrial Technology. The general industrial technology degree is for individuals seeking careers in industry who wish to strengthen their background in industrial materials, processes, and manufacturing management. Enough flexibility is allowed in the program requirements for students to meet their individual goals. Plan A is strongly encouraged for this emphasis, but Plan B is allowed for unique projects.

Technology Education. The Technology Education specialization is designed for industrial educators who want to strengthen their background in current educational theory and practice. Students are required to complete a professional core of courses relating to technology education or applied technology education and to select additional courses from a list of related courses. Plan A requires a minimum of 30 semester credits, including a thesis. Plan B is a nonthesis option that requires 36 semester credits, including a creative project. The core courses for this specialization are as follows: ITE 6090, 6100, 6150, 6450, and 6750.

Financial Assistance

The department offers a limited number of graduate research and teaching assistantships. For further information, contact the Industrial Technology and Education Department.

Industrial Technology and Education Courses (ITE)

1000. Orientation to Technology Education. Introduction to the technology education teaching profession, including programs, facilities, goals, and opportunities. (1F)

1010. Communications Technology. Introduction to tools, materials, equipment, and processes used to transmit and receive messages. Major emphasis on hardware, software, communications, and the digital age. (3F)

1020. Energy/Power/Transportation I. Exploration of the concepts and processes relating to the source, conversion, transmission, and control of energy relating to use in industry, domestic, and transportation. (3Sp)

1030. Material Processing and Tooling Systems. Introduction to properties of industrial materials (metallic, polymeric, ceramic, and composite), processes used to produce standard stock and finished products, design and construction of simple jigs and fixtures, and the use of precision measuring instruments in manufacturing. (3F,Sp)

1040. Construction and Estimating. Overview of construction industry and its practices. Reviews four major parts of construction industry, including: (1) Inputs: materials; (2) Process: design and building of structures; (3) Outputs: sites, buildings, etc.; and (4) Feedback: effects of building systems. Provides prospective technology education teachers with opportunity to study and perform activities related to the field of construction and estimating. At completion of course, students should be able to demonstrate knowledge and skills required to implement a construction technology program. (3Sp)

1100. The Aviation Profession. Covers attributes of aviation professional, career planning, and certification process. (1F,Sp)

1130. Flight Principles. Basic flight theory and physics of flight. Aircraft control systems related to flight. Ground handling and servicing of aircraft. Special lab fee. (2F)

1140. Aircraft Components and Principles. Materials and hardware, as well as nondestructive inspection applicable to aircraft. Plumbing methods, maintenance publications, and aircraft weight and balance control. (2F)

1170. Aircraft Structures. Accepted methods and repair for metal structures. Organic finishes and application techniques with laboratory applications and practical experience. (3F)

1200. Computer-Aided Drafting and Design. Provides students with ability to accurately produce basic engineering, 2-D, and pictorial drawings using traditional and computer-aided drafting techniques. Introduction to drafting fundamentals and equipment associated with the drafting industry, including drawings, reproductions, and computer-aided techniques. (3F,Sp,Su)

1240. Aircraft Maintenance. Maintenance, repair, alteration, and inspection of aircraft. Assembly and rigging of control systems with laboratory application of maintenance assembly and rigging procedures. Prerequisites: ITE 1130, 1140. (3Sp)

1640. Introduction to Welding. Theory of Oxy-Acetylene Welding, Shielded-Metal Arc Welding, and Gas Metal Arc Welding. Must take a lab concurrently with ITE 1640, either ITE 1650 for general students or ITE 1660 for Welding Engineering Technology majors. (1F)

1650. OA, SMA, GMA Welding Laboratory. Introductory lab course for non-Welding Engineering Technology majors. Students will develop skill with Oxy-Acetylene Welding, Shielded-Metal Arc Welding, and Gas Metal Arc Welding. Must be taken concurrently with ITE 1640. (2F)

1660. Shielded Metal Arc Welding Lab. Lab course for Welding Engineering Technology majors. Students develop skill with Shielded-Metal Arc Welding including certification to D1.1. Must be taken concurrently with ITE 1640. (2F)

2030. Manufacturing Technology and Enterprise. Focuses on management technology used to establish and finance a manufacturing firm, engineer a product and production system, and market a product. Emphasizes operation of basic machine woodworking equipment and a study of its uses. Prerequisite: ITE 1030. (3F)

2100. Aircraft Reciprocating Powerplants and Accessories. Theory of operation, maintenance, and repair of reciprocating engines, propellers, exhaust systems, ignition systems, and fuel systems with laboratory applications of principles and components studied. Prerequisite: ITE 2110 (must be taken concurrently). (3F)

2110. Aircraft Reciprocating Powerplants and Accessories Lab. Laboratory application of principles studied in ITE 2100. Prerequisite: ITE 2100 (must be taken concurrently). (3F)

2140. Aircraft Turbine Powerplants and Maintenance Operations. Theory of turbine powerplants, including turbine engine and components operation, hot section inspection, and servicing. Aircraft engine 100-hour inspections and maintenance, with laboratory applications of principles and components studied. Prerequisite: ITE 2150 (must be taken concurrently). (3Sp)

2150. Aircraft Turbine Powerplant Maintenance Operations Lab. Theory of turbine powerplants, including turbine engine and components operation, hot section inspection, and servicing. Aircraft engine 100-hour inspections and maintenance, with laboratory applications of principles and components studied. Prerequisite: ITE 2140 (must be taken concurrently). (3sp)

2170. Aircraft Systems. Theory and operation of aerospace environmental systems,

communication, navigation and guidance systems, fuel and propellant systems, fire detection, and warning. (2Sp)

2180. Aircraft Hydraulic and Pneumatic Systems. Theory and operation of aircraft hydraulic, landing gear, and brake systems. (2F)

2190. Aircraft Systems Lab. Laboratory application of principles and components studied in ITE 2170. Prerequisite: ITE 2170 (must be taken concurrently). (1Sp)

2200. Aircraft Hydraulics and Pneumatics Systems Lab. Laboratory application of principles and components studied in ITE 2180. Prerequisite: ITE 2180 (must be taken concurrently). (1F)

2240. Analog Devices and Circuits. Study of differential amplifiers; operational amplifiers; regulators; and generator instrumentation amplifier, multiplier, and active filters. Prerequisite: ITE 2310. (4Sp)

2250. Internship. Planned supervised work experience in industry. Must have departmental approval. (1-4F,Sp,Su) ®

2270. Computer Engineering Drafting. Provides students with ability to accurately produce computer-aided drafting software. Since there are no drafting prerequisites for this course, drafting fundamentals are also introduced. (2F,Sp,Su)

2300. Electronic Fundamentals. Study and application of DC and AC concepts, semiconductors, digital electronics, and microcomputers. Prerequisite: Math 1050. (4F)

2310. AC/DC Circuits. Study of AC/DC principles beyond those taught in ITE 2300. Includes network theorems, capacitance, inductance, impedance, reactance, resonance, and transformers. Prerequisite: ITE 2300. (2Sp)

2320. Electronic Drafting. Study of electronic drafting practices. Students exposed to various areas of electronic drafting and fabrication. Prerequisites: ITE 1200 and 2300. (2Sp)

2330. Private Pilot Ground School. Instructions in principles of flight, aircraft and engine operation, weather, navigation, radio aids to navigation, radio communications, and federal air regulations. Preparation for FAA Private Pilot written exam. (4F,Sp)

2350. Private Pilot Certification. FAA approved flight training program meeting all requirements for, and in the issuance of, the Private Pilot Airplane License. Prerequisite: ITE 2330 (may be taken concurrently). (2F,Sp,Su)

2360. Digital Circuits. Logic circuits, combinational and repeated circuits, counters, shifts registers, state tables, PLD's, and digital computer simulations. Prerequisite: ITE 2300 or equivalent. (3Sp)

2370. Computer and Microprocessor Programming. Introduction to microprocessors and computers. Study of machine language programming, assemblies and cross assemblies, emulators, and input and output devices. Prerequisite: ITE 2300. (4Sp)

2400. Active Devices and Circuits. Study of diodes; transistor principles, including semiconductor theory, bipolar, and field effect device characteristics; and modern thyristor devices. Prerequisite: ITE 2310. (3F)

2420. FAA Regulations, Records, and Certification. Maintenance forms, records, and regulations releasing aircraft to airworthy status. Certification of maintenance technicians is also included. (2Sp)

2430. Aircraft Electrical Systems and Components. Aircraft electrical power generating systems. Theory of generation, alternators, regulation, and control systems with laboratory application of principles and systems studied. Prerequisite: ITE 2300. (2Sp)

2440. Aircraft Electrical Systems Laboratory. Laboratory application of principles and systems studied in ITE 2430. Prerequisites: ITE 2300; ITE 2430 (must be taken concurrently). (2Sp)

2510. Intermediate Flight. FAA approved flight training program that fulfills the cross country requirements for commercial and instrument ratings. Prerequisite: ITE 2350. (2F,Sp,Su)

2520. Instrument Pilot Ground School. Ground school approved by FAA under Part 141 of the Federal Aviation Regulations. Designed to prepare students to pass the FAA oral and written examinations required for becoming instrument rated pilots. Prerequisite: ITE 2350. (4F)

2540. Instrument Pilot Certification. FAA approved flight training program meeting all the requirements for, and the issuance of, the Instrument Pilot Airplane Rating. Prerequisites: ITE 2350; ITE 2520 (may be taken concurrently). (2F,Sp,Su)

2620. Commercial Pilot Ground School. Commercial flight operations including performance, cross country planning, advanced systems operations, complex airplanes, and flight maneuvers. Prerequisites: ITE 2350 and 2520. (2Sp)

2660. Commercial Pilot Certification. Flight instruction to meet FAA requirements and completion of tests for certification. Prerequisites: ITE 2540; ITE 2620 (may be taken concurrently). (3F,Sp,Su)

2670. GMA, FCA, and GTA Welding. Theory and skills course covering Gas Metal Arc Welding, Flux Cored Arc Welding, and Gas Tungsten Arc Welding. Enrollment limited to Welding Engineering Technology majors or by permission. Prerequisites: ITE 1640, 1660. (3Sp)

2720. CFI and CFII Ground School. Designed to prepare students to pass the FAA oral and written examinations required for becoming certified flight and instrument instructors. Combines Certified Flight Instructor and Certified Flight Instructor-Instrument into one course. Prerequisite: ITE 2660. (3F)

2740. CFI Certification. FAA-approved flight training program meeting all requirements for the issuance of the Certified Flight Instructor Airplane Rating. Prerequisite: ITE 2720 (may be taken concurrently). (1F,Sp,Su)

2850. Statics and Strength of Materials. Engineering technology course covering resultants and equilibrium of force systems; moments of inertia; method of work; stess, strain, and deflection due to tension, compression, and torsion; and Mohr's circle for stress and strain. Prerequisite: Math 1100. (3F)

2860. CFII Certification. FAA approved flight training program meeting all the requirements for, and issuance of, the Certified Flight Instructor, Airplane Instrument Rating. Prerequisites: ITE 2720 and 2740 (may be taken concurrently). (1F,Sp,Su)

2880. Multi-Engine Certification. FAA approved flight training program meeting all the requirements for, and the issuance of, the Multi-Engine Airplane Rating and the Certified Flight Instructor Multi-Engine Airplane Rating. Prerequisite: ITE 2660. (1F,Sp,Su)

3010. National Airspace Systems and Control. Study of national air traffic control system, airspace usage, and facilities. (3F,Sp)

3020. Energy/Power/Transportation II. Application of principles of power, energy, transportation, and alternative energy. Prerequisite: ITE 1020. (3F)

3030. Computer-Integrated Manufacturing and Robotic Systems. Introduction to principles, operations, and applications of computer-controlled manufacturing systems, including: CNC, CAD/CAM, robotics, programmable logic controllers, bar code readers, etc. Prerequisite: ITE 1030. (3Sp)

3050. Graphic and Electronic Communication Technology. Introduction to modern graphic and electronic communication systems. Emphasizes design, development, production, and dissemination of both electronic and graphic

messages. Covers major concepts, including desktop publishing, and audio and video production techniques. (3Sp)

3060. Codes, Weld Inspection, and Quality Assurance. Study of ASME and AWS codes as relating to procedure qualification and welder qualification for fabrication of pressure vessles and structures, and how codes relate to quality assurance and ISO 9000. Prerequisite: ITE 2670. (3F)

3070. Technology Education for Elementary Schools. Introduction to technology education and to science, technology, and society (STS) curricula for elementary schools, emphasizing teaching, developing, and managing technology-based activities. (3F)

3090. Welding Power Sources. Study of power sources used to generate and control voltage and amperage for welding. Prerequisites: ITE 2300, 2310, 2670. (2Sp)

3120. Aviation Law. Law as it affects aviation industry. Rights and responsibilities of individual organizations and the aviation community. Regulation and liability pertaining to design, manufacturing, operation, and maintenance of aircraft. Prerequisite: ITE 1100. (3F)

3140. Advanced Avionics Systems and Flight Simulation. In-depth study of state of the art aircraft instrumentation systems and advanced flight training utilizing a flight simulator. Prerequisite: ITE 2540. (3Sp)

3200. Methods in Industrial Education I. Classroom laboratory practicum for design, practice, and performance of industrial education demonstrations and lab activities. Prerequisites: ITE 1000; ITE 3300 (must be taken concurrently). (3F)

3220. Architecture and Construction Systems. Basics of architectural computer-aided drafting. Includes introduction to principles of construction. Explores residential and commercial systems, emphasizing construction codes. Prerequisite: ITE 1200 and Math 1050. (3F)

3230. Machine and Production Drafting. Teaches students to accurately produce both design drawings and working drawings. Explores techniques, symbols, and conventions used to represent gears, cams, jigs, and fixtures. Also includes advanced techniques of production drawing, emphasizing Geometric Dimensioning and Tolerancing. Prerequisites: ITE 1200, Math 1050, or equivalent. (3F)

3240. Technical Illustration. In-depth study of technical illustration. Includes preparation of pictorial drawings with rendering added. Explores industrial and architectural environments. Introduces rendering and animation software, emphasizing three-dimensional modeling. Prerequisite: ITE 1200. (3Sp)

3270. Advanced Computer-Aided Drafting. Designed to enhance CADD productivity, encourage customization, and introduce students to advanced CADD techniques, including programming and introduction to parametric design. Prerequisite: ITE 1200. (3Sp)

3280. Advanced Turbine Engines. Advanced study of turbo-jet propulsion. Comparative examination of jet, fan, turbo-prop, and turbo-shaft engines. Prerequisite: ITE 2140. (2F)

3300. Clinical Experience I. Field-based experiences in secondary schools. Students complete 30 hours of tutoring students and assist teachers with managerial, clerical, and other professional tasks. Prerequisites: ITE 1000; ITE 3200 (must be taken concurrently). (1F)

3380. Microprocessor and Computer Interfacing. Microcomputer interface applications, including digital system interface, serial and parallel interfacing, and D/A and A/D converters. Prerequisite: ITE 2370. (4F)

3390. Microcontrollers. Study of microcontrollers and applications. Includes programming and building circuits. Prerequisite: ITE 2370. (3Sp)

3400. Communication Circuits. Introduction to radio frequency communication circuits. Includes oscillators, modulation, transmitters, receivers, transmission lines, antennas, RF propagation, digital signal processing, GPS, and spread spectrum. Prerequisites: ITE 2240, 2300, and 2400. (4F)

3410. FCC License. Prepares students to obtain the FCC General Radio Telephone Operator's License. Covers electronic fundamentals through microwave radar and FCC rules and regulations. Prerequisite: ITE 3400. (1Sp)

3510. Introduction to Networking. Study of hardware and software required to build, install, maintain, and support a local area network. Emphasizes laboratory applications. Prerequisites: ITE 3400; BIS 5200 (may be taken concurrently). (3F)

3610. AeroTechnology Design I. Students select and plan a senior project. Requires written proposal, including technical description of the project and management plans. (1Sp)

3630. Fusion Joining and Brazing Processes. Study of SAW, ESW, GMAW-EG, RW, PAW, PAC, Electron Beam, Laser, Friction, Brazing, and other welding processes. Prerequisites: Professional status and ITE 2670. (3F)

CI 3650. Technology Education Senior Research I. Students select and plan an applied research project. Requires written proposal, including technical description of the project and management plans. Should be taken spring semester of the junior year. (2Sp)

3670. Design for Welding. Design of weldments and welded connections. Prerequisites: ITE 2850 and Phyx 1800. (3Sp)

3710. Electronics/Computer Design I. Students select and plan a senior project. Requires written proposal, including technical description of the project and management plans. (1Sp)

3740. Facility and Equipment Maintenance. Systems approach to facility, equipment, and tool maintenance, including principles of woodworking, machine construction, adjustment, and sharpening. (3)

3750. Alternative Energy and Energy Systems. Principles and application of alternative power and energy systems, including solar, thermal, wind power, and biogas. (3Sp)

3810. Welding Design I. Students select and plan a senior project. Requires written proposal, including technical description of the project and management plans. (1Sp)

3820. Nondestructive Testing. Fundamental concepts relating to liquid penetrant, magnetic particle, ultrasonic, radiography, and other NDT processes. Prerequisites: Math 1100 and Phyx 1800. (3Sp)

3900. Principles and Objectives of Industrial Education. Comprehensive study of philosophy and purposes of industrial education programs and their place in the total program of modern education. (3)

3930. Evaluation of Industrial Subjects. Factors for evaluation of attitudes, skills, work habits, technical information, and instrument construction. (2)

4200 (d6200).[1] Composite Manufacturing Processes and Repair. Composite manufacturing processes, composite materials survey, tooling design and fabrication, autoclave processes, vacuum bag techniques, filament winding processes, equipment requirements, materials cutting and storage, and composite materials testing. (3Sp)

4250. Internship. Planned supervised work experience in industry. Prerequisite: Departmental approval. (1-6F,Sp,Su) ®

4260. Airport Planning and Administration. Airport planning, development, and management and their importance to the achievement of a successful airport operation. Management of publicly owned and operated airports, ranging in size from general aviation to the large air carrier hubs. Prerequisite: ITE 1100. (3F,Sp)

4280. Airline Operations. Study of airline operations and their organizational structure. Examines functions of airline dispatcher, operations specialists, managers, and cockpit flight crew. Discussion of advanced flight planning, aircraft performance

and loading considerations, and impact of weather on flight operations and routing priorities. Prerequisite: ITE 1100. (3F)

4300. Clinical Experience II. Field-based experience, in which students complete 30 hours of teaching-related experiences in the classroom. Prerequisites: ITE 3200, 3300; ITE 4400 (must be taken concurrently). (1Sp)

4310 (d6310). Corrosion and Corrosion Control. Analysis of corrosion mechanisms for ferrous metals, nonferrous metals, and nonmetallic materials, as well as the control of corrosion. Prerequisites: Chem 1110 and Math 1060. (2Sp)

4400. Methods in Industrial Education II. Techniques of teaching as applied to individual and group instruction. Students apply various methods in presenting lessons. Prerequisites: ITE 3200, 3300; ITE 4300 (must be taken concurrently). (3Sp)

4440 (d6440). Technology and Society. Study of dynamic interaction between technology and society. Examines human responsibility for directing changes in our future. (3Sp)

4480. Certified Flight Instructor Practicum. Under supervision of ground school instructor, students gain practical experience teaching private pilot ground school subjects. Prerequisite: ITE 2740. (2F,Sp)

4490. Human Factors in Aviation Safety. Examines major causative agent in aircraft accidents: the human being. Emphasizes psychological and physiological factors enhancing accident probability. Includes detailed analysis of ergonomics (human engineering) and its influence on safety. Prerequisite: ITE 1100. (3Sp)

4580. Occupational Safety and Health Management. Management practices and principles as applied to safety and health ethics, laws, organizations, programs, and varied functions of the safety and health professional. (2Sp)

CI 4610. AeroTechnology Design II. Execution and completion of a team or individual project. Requires design reviews and written reports. Prerequisite: ITE 3610. (3F)

CI 4620. AeroTechnology Design III. Preparation and presentation of a team or individual project. Writing and speaking skills emphasized through technical reports and presentations. Prerequisite: ITE 4610. (3Sp)

CI 4650. Technology Education Senior Research II. Execution and completion of a team or individual project. Writing and speaking skills emphasized through technical reports and presentations. Prerequisite: ITE 3650. (1Sp)

CI 4660. Flight Senior Project. Students select, plan, and execute an approved senior project. Writing and speaking skills emphasized through technical reports and presentations. (3F,Sp)

4700. Student Teaching in Postsecondary Schools. Planning, presenting, and evaluating instruction for students in postsecondary industrial and technical programs under the supervision of an experienced teacher. Enrollment by permission only. (4F)

CI 4710. Electronics/Computer Design II. Execution and completion of a team or individual project. Requires design reviews and written reports. Prerequisite: ITE 3710. (3F)

CI 4720. Electronics/Computer Design III. Preparation and presentation of a team or individual project. Writing and speaking skills emphasized through technical reports and presentations. Prerequisite: ITE 4710. (3Sp)

CI 4810. Welding Design II. Execution and completion of a team or individual project. Requires design reviews and written reports. Prerequisite: ITE 3810. (3F)

CI 4820. Welding Design III. Preparation and presentation of a team or individual project. Writing and speaking skills emphasized through technical reports and presentations. Prerequisite: ITE 4810. (3Sp)

4930. Independent Study. Upon application, students may propose and complete work above and beyond regular coursework to support or supplement their major. (1-4F,Sp,Su) ®

4940. Related Industrial Experience. Provision for enrollment in industry schools conducted on university level. Approved by department upon application for trade competency examination and work experience in industry. (1-12F,Sp,Su) ®

5040. Manufacturing Enterprise. Focuses on management technology used to establish a manufacturing enterprise, engineer a product and production system, finance the operation, and market the product. Prerequisite: ITE 1030. (3F)

CI 5220. Program and Course Development. Review of basic principles and practices of curriculum and course development used in applied technology and technology education. Emphasizes components needed to develop a curriculum guide. Prerequisites: ITE 3200, 3300. (4Sp)

5230. Technical Training for Innovative Programs. Prepares prospective and incumbent teachers to implement and conduct contemporary programs. Includes skill development and the philosophy needed for curriculum innovation. (1-4F,Sp,Su) ®

5240. Principles of Technology. Introduction to applied technology principles forming the basis for today's society. (2-3Sp)

5500. Student Teaching Seminar. Focuses on observations and problems arising during student teaching. Includes review of teaching plans, procedures, adaptive classroom practices, and evaluation. Prerequisite: ITE 5600 (must be taken concurrently). (2F)

5600. Student Teaching in Secondary Schools. Candidates assigned to cooperating teachers in public secondary schools within their major and minor subjects. Students have professional responsibilites with teaching. Prerequisite: ITE 5500 (must be taken concurrently). (8F)

5750. Welding Metallurgy I. Metallurgical principes applied to welding and weldability of ferrous metals. Prerequisites: ITE 2850, 3630. (3F)

5760. Welding Metallurgy II. Metallurgical principles applied to welding and weldability of nonferrous metals. Prerequisite: ITE 5750. (3Sp)

5800. Seminar—Technology Education. Provides opportunity for students to participate in variety of enriching experiences, such as guest speakers, field trips, demonstrations, and conferences. (1-3F,Sp,Su) ®

5890. Seminar—Welding Engineering Technology. Professional seminar specifically designed to introduce students to industry experts. Limited to welding students. (1F,Sp) ®

5900. Workshop in Industrial Technology and Education. Special workshops for education or industry. May be repeated providing content varies. (1-4F,Sp,Su) ®

5910. Special Problems in Industrial Technology and Education. (1-4F,Sp,Su) ®

5920. Related Technical Training. (1-12F,Sp,Su) ®

6090. Program Design in Technology and Industrial Education. Study of contemporary program design and development in technology and industrial education. Reviews complete curriculum developmental process. (3F,Sp,Su)

6100. Contemporary Issues in Technology and Industrial Education. Study of present and future foundational professional developments in technology and industrial education. Students identify and investigate contemporary trends and issues affecting and facing technology and industrial education. (3F,Sp,Su)

6150. Evaluation and Assessment in Technology and Industrial Education.

Study of various methods used to measure and evaluate student achievement, including cognitive, affective, and psychomatic. Reviews principles of learning and teaching, and of evaluation of instruction. (3F,Sp,Su)

6200 (d4200). Composite Manufacturing Processes and Repair. Composite manufacturing processes, composite materials survey, tooling design and fabrication, autoclave processes, vacuum bag techniques, filament winding processes, equipment requirements, materials cutting and storage, and composite materials testing. (3Sp)

6250. Internship. Advanced instruction through supervised work experience in teaching, supervising, or administering educational or industrial program. (1-6F,Sp,Su)

6310 (d4310). Corrosion and Corrosion Control. Analysis of corrosion mechanisms for ferrous metals, nonferrous metals, and nonmetallic materials, as well as the control of corrosion. Prerequisites: Chem 1110 and Math 1060. (2Sp)

6440 (d4440). Technology and Society. Study of dynamic interaction between technology and society. Examines human responsibility for directing changes in our future. (3Sp)

6450. Administration and Organization of Technology and Industrial Education. Administrative and supervisory techniques for successful operation of technology education and applied technology education programs. (3F,Sp,Su)

6520. Explorations of Industry. Study of contemporary industry, business, and service through a series of site visits. Includes various management and finance methods and techniques. (3F,Sp,Su)

6610. Computer Delivery Systems in Technology and Industrial Education. Introduces current computer technologies used in education. Explains how these technologies aid in development, preparation, and delivery of materials in a professional environment. Explores educational research and development of these technologies, with results being disseminated to others in the discipline. (3F,Sp,Su)

6750. Research and Grant Writing in Technology and Industrial Eduacation. Introduction to practical research planning and design. In-depth review of steps and techniques needed in grant writing. Guides students from problem selection to completed proposal and to final research report. (3F,Sp,Su)

6800. Seminar. (1-2F,Sp,Su)

6900. Readings and Conference. Advanced individualized study on selected topics in technology and industrial education. Scheduled consultation with faculty member. (1-3F,Sp,Su)

6910. Experimental Laboratory in Technology and Industrial Education. Introduction to elements of a research report through selection and development of experimental study utilizing tools, equipment, materials, and processes for improving programs and teaching techniques. (3F,Sp,Su)

6930. Independent Study. Advanced educational experience through individual investigation. (1-6F,Sp,Su)

6960. Master's Project. Development of creative project emphasizing a thoroughly developed plan of action. Includes proposal, project paper, and final presentation. (3-6F,Sp,Su) ®

6970. Thesis Research. (1-9F,Sp,Su)

6990. Continuing Graduate Advisement. (1-2) ®

7230. Foundations of Technology and Industrial Education. Study of the objectives, legislative foundations, principles, philosophy, impact, and organization of technology and industrial education. (3F,Sp,Su)

7460. Finance of Technology and Industrial Education. Procedures in financial administration of industrial education monies: budget preparation, budget operation and control, and school accounting. (3F,Sp,Su)

7810. Research Seminar. Identification of research problems, consideration of research strategies and methods, application of research and statistical concepts in departmental focus, and interaction with faculty. (1-6F,Sp,Su)

7970. Dissertation Research. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Instructional Technology

College of Education

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education; **Adjunct Assistant Professor** *Gary S. Poppleton,* utilization; **Adjunct Instructors** *Val W. Dawson,* instructional development; *JaDene M. Denniston,* school library media; *Penny Findlay,* interactive learning; *Thomas M. Risk,* multimedia development; *Nathan M. Smith, Jr.,* computer applications; *Marilyn Taylor,* school library media

Degrees offered: Master of Education (MEd), Master of Science (MS), Educational Specialist (EdS), Doctor of Philosophy (PhD) in Instructional Technology

Graduate specializations: *MEd*–Educational Technology, Information Technology and School Library Media Administration; *MS and EdS*–Instructional Development for Training and Education

Undergraduate Programs

Objectives and Requirements

There is no major in instructional technology at the undergraduate level because of the need for those preparing in the field to have especially strong general education knowledge as well as depth in a specialized field of study. The minors include School Library Media or Multimedia Development. The objectives and requirements of these minors are as follows:

School Library Media Minor Objectives

1. Provides students with library media skills.
2. Prepares students to receive a Utah Library Media Certificate.
3. Prepares students for employment as a School Library Media Specialist.

School Library Media Minor Requirements

This minor is available only through distance education. Those persons wanting to certify for positions in the public schools must complete a teaching certificate and the prescribed School Library Media minor. A 2.7 grade point average is required for admission and certification as an instructional media specialist at the bachelor's level. For detailed requirements, contact the department.

Multimedia Development Minor Objectives

1. Provides students with design skills.
2. Develops students' multimedia production skills.
3. Prepares students for employment in the multimedia field.

Multimedia Development Minor Requirements

Persons not seeking a public school position may elect the minor in Multimedia Development, in conjunction with a major in other fields. The Multimedia Development minor is especially appropriate for fields which require computer-based instruction, such as business, computer science, engineering, communications, and others. For detailed requirements, contact the department.

Graduate Programs

Instructional technology is a systematic way of designing, developing, implementing, and evaluating the processes of learning and teaching with specific objectives based on research in human learning and communication. It employs a combination of human and nonhuman resources to bring about more effective instruction. Instructional technology includes aspects of instructional design, product development, interactive learning technologies, multimedia, electronic distance education, and library and information technology. Each aspect of the field has unique contributions to make to the teaching-learning process.

Graduates are in demand in business and industrial settings, as well as in education, because of their preparation in training and instructional design. Admission to the graduate program is open to all students regardless of their undergraduate preparation.

Admission Requirements

See general admission requirements, pages 60-61. The MS and MEd admission requirements include a 3.0 GPA for the last 60 semester credits (90 quarter credits) and an MAT score or GRE verbal and quantitative scores at or above the 40th percentile. In addition, the department requires that those applying for the EdS program have a master's degree, and a score at or above the 40th percentile on the verbal/quantitative tests of the GRE or 46 or above on the MAT. Those applying for the PhD program must have GRE verbal and quantitative test scores at or above the 40th percentile. Demonstrated writing and computer proficiency is required of all applicants. TOEFL scores are required for candidates from abroad with a minimum of 550 deemed acceptable.

Applications for the MS and MEd for the following academic year (which starts in August) must be submitted to the School of Graduate Studies by January 31. If sufficient acceptable candidates are not available, additional qualified candidates will be considered until the beginning of summer semester. Applications for the EdS and PhD will be considered throughout the year. However, students who wish to be considered for financial aid must submit applications by March 15 for the coming academic year. All graduate students are expected to begin their programs in the fall semester.

Applicants for the EdS and PhD programs who do not hold a master's degree in Instructional Technology must complete additional credits.

No applications will be considered until all required information arrives in the office of the School of Graduate Studies.

Degree Programs

Master of Science (MS). This degree emphasizes instructional development, and prepares the graduate with skills to apply

principles of instructional systems design to education and training. The program prepares instructional developers to take positions in corporate training programs in business and industry. It also leads to careers in public and higher education, development of interactive learning technologies, telecommunications, distance education, and adult education.

The MS degree is available to qualified students with bachelor's degrees from any field. Undergraduate students planning in advance for an MS in Instructional Technology should consider the department's Multimedia Development minor as part of their bachelor's program.

Master of Education (MEd). This master's program is only available through extension and distance education via EDNET (a two-way audio/video system). The MEd degree is a three-year cohort rotation (i.e., students proceed as a group through the three-year program). The next rotation begins Fall Semester 1999. To be successful in this master's degree program, students should own or have access to a personal computer. They will also need an e-mail address and internet access in order to communicate with faculty members and other students in the program. Persons choosing the Instructional Technology MEd have two specializations available: Educational Technology and School Library Media Administration.

The **Educational Technology** specialization is directed to public school educators and administrators who are knowledgeable in their content areas, but would like to apply the principles of educational technology to the teaching/learning process. This specialization may lead to a position as a district or building educational technology specialist. This person becomes responsible for the in-service training of teachers related to computers and other technologies.

The **School Library Media Administration** specialization is directed at persons seeking employment in a school library media center. Students seeking this specialization must complete the School Library Media minor (available only through extension and distance education) and apply for a Utah State Library Media Certificate. This specialization may lead to a position as a district school library media specialist (K-12). The library media specialist is prepared to apply principles of library and information technology to help students and teachers be successful. The library media specialist also understands the effective use of educational materials, media equipment, facilities, and other learning resources in the teaching/learning process.

Educational Specialist Degree (EdS). The Educational Specialist degree is for students interested in acquiring advanced skills in instructional technology beyond those of the master's degree. This program involves coursework, independent study, practicum experiences, and a culminating experience with a required written report, which is defended. The degree requires a minimum of 30 credits beyond the master's degree, providing the master's degree was received in the instructional technology field. For students with a master's degree in a field other than instructional technology, a minimum of 40 credits is required. For students without a master's degree, 60 semester credits are the minimum required credits.

Doctoral Degree (PhD). The doctor of philosophy degree is for students wanting to do research and high-level theory building in instructional design and development. Graduates seeking a career in higher education, research centers, or corporate training and development will find this degree useful.

Course Requirements. Course requirements for all degrees are dependent upon area of emphasis and are individually planned by the student and the supervisory committee. For planning materials and program details, contact the department.

Financial Assistance. Departmental, grant, assistantship, and other financial support is available and is awarded on a competitive basis. Apply through the department.

Instructional Technology Courses (InsT)

1000. Information Literacy. Designed to develop ability to locate, evaluate, and use information. Develops competencies needed for the lifelong pursuit of information through the use of libraries, and print and electronic resources. (2F,Sp,Su)

3000. Principles and Practices of Technology for Secondary Teachers. Integrated experience for pre-service secondary teachers to apply instructional design principles in their instruction. Hands-on experience using a wide variety of technological tools in practical learning environments. Application of technology as both process and product. Prerequisite: Admittance to teacher education. (2F,Sp)

4010. Principles and Practices of Technology for Elementary Teachers. Integrated experience for pre-service elementary teachers to apply instructional design principles in their instruction. Hands-on experience using a wide variety of technological tools in practical learning environments. Application of technology as both process and product. Prerequisite: Admittance to teacher education. (3F,Sp,Su)

4910. Undergraduate Research and Creative Opportunity. Cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. (1-3F,Sp,Su) ®

5000. Foundations of Library Media Programs. Introduction to historical and philosophical foundations of library media programs for teachers, administrators, and media specialists. Examines role of library media programs in schools and their contributions to the curriculum. Taught off-campus only. (3Su)

5010. Information Organization and Management. Explores functions of information technology including circulation, cataloging, automation tools, and technical services within school library media program. Also considers policies and techniques for facilitating access to information in a school library media center. (3Su)

5020. Collection Development. Focuses on building and maintaining collections for library media programs. Discusses policy development for selection, protecting intellectual freedom, and reviewing, evaluating, and maintaining materials in all formats. Evaluation of school library collections also investigated. (3Su)

5030. Information Access. Introduction to finding information and resources using print and electronic sources. Emphasizes reference services, knowledge of basic reference/information sources, and resource sharing; and teaching information retrieval strategies within a school library media program. (3Su)

5040. Library Media Center Administration. Includes study of organization, personnel, budgets, programs, and management of a library media center. Students define their role within a school setting and in relation to that of the principal and teachers. Prerequisite: InsT 5000 or approval of instructor. (3Su)

5050. Library Media Programs. Presents a wide variety of activities which are integral to a school library media program, including reading guidance, instructional development, curriculum development, media skill instruction, and information literacy. Prerequisite: InsT 5040 or approval of instructor. (3Su)

5100. Management and Maintenance of Information Technologies. Introductory course in basic operation of technology tools used in school setting. Includes operation of video equipment, video cameras, Internet sites, CD-ROM, satellite

receiving equipment, computer scanners, computer networks, and computer presentation systems. (1Su)

5190. Library Media Practicum. Observation and guided field experience in a library media center under professional library media specialists and instructional technology professionals. Bridge of theory into practice for students seeking certification. This course is required for those having limited or no school library media experience, as evaluated by their faculty adviser. Prerequisites: InsT 5040, 5050; or approval of instructor. (1-6F,Sp,Su) ®

5210 (d6210).[1] Digital Audio-Video Production. Fundamental theories and practice in camera and computer-based audio and video production, including recording, editing, and digitizing audio and video segments for education and training applications. (3F,Su)

5220 (d6220). Computer-Based Instruction Authoring Tools. Fundamentals of programming computer-based instruction, utilizing current authoring languages and systems. Prerequisite: Basic computer competencies. (3F,Su)

5230. Instructional Graphic Production. Fundamental practices of using the computer to design and produce a wide variety of instructional graphics and animations. (3F,Sp,Su)

5240. Producing Distance Education Resources. Focuses on production of CD-ROM, computer, internet, print-based, and other electronic instructional resources which can be used to deliver distance education. (3F,Sp,Su)

5300. Multimedia Production for Instruction and Training. Students use knowledge acquired in prerequisite courses to design, produce, and master a multimedia instructional product. Prerequisites: InsT 5210, 5220, 5230, 5240. (3Sp,Su)

5400. Computer Applications for Instruction and Training. Introduction to use of computer applications, with special emphasis on software used in instruction and training. (3F,Sp,Su)

5750. Instructional Technology Workshop. Special training and experience in latest concepts and innovations in instructional technology. Content changes to reflect most recent topics and problems facing the profession. (1-4Su) ®

5900. Independent Study. Individually directed study and projects. Prerequisite: Departmental permission. (1-4F,Sp,Su) ®

6000. Foundations of Instructional Technology. Considers the present, past, and future of instructional technology, while helping individual student to develop personal understanding of and orientation to the field. Taught off-campus only. (3F)

6010. Technology and its Role in the Transformation of Education. Explores the critical role of educational technology as one tool in the transformation of education. Involves students in change-related projects in the local environment. Taught off-campus only. (3F)

6080. Instructional Technology Core. Introduction to fundamental concepts of instructional technology. Required for all students in first matriculated semester. Prerequisite: Computer literacy. (6F)

6150. Communication, Instruction, and the Learning Process. Examination of learning theory and communication theory, and their implications for instruction. Taught off-campus only. (3Sp)

6210 (d5210). Digital Audio-Video Production. Fundamental theories and practice in camera and computer-based audio and video production, including recording, editing, and digitizing audio and video segments for education and training applications. (3F,Su)

6220 (d5220). Computer-Based Instruction Authoring Tools. Fundamentals of programming computer-based instruction, utilizing current authoring languages and systems. Prerequisite: Basic computer competencies. (3F,Su)

6250. Instructional Design Theory. Detailed study of prominent instructional design theories, including their application to instructional product development. Prerequisite: InsT 6080. (3Sp,Su)

6260. Learning and Communication Theories in Instructional Technology. Detailed study of communication and learning theories as applied to the instructional design process. Examines principles and research upon which instructional design and instructional technology are based. Prerequisite: InsT 6080. (3F)

6350. Instructional Design Process. Examines key techniques in design of instruction. Applies principles to specific design problems. Introduces techniques for developing instructional products according to completed designs. Taught off-campus only. (3F)

6360. Computers in Education for In-service Teachers. Introduction to microcomputer applications in education for in-service teachers. Includes hands-on experiences with range of software tools for design, production, and administration. Taught off-campus only. (3Sp)

6370. Design and Development of Computer-Based Instruction. Overview of computer-based design issues, including interface/screen design, instructional strategy and interaction, and computer program logic. Includes hands-on experience with authoring systems. Taught off-campus only. (3F)

6380. Distance Learning—K-12. Designed for classroom teachers. Discusses technologies and applications of distance education to elementary and secondary school settings. Focuses on instructional strategies for effective teaching and learning at a distance. Taught off-campus only. (3Sp)

6390. Planning and Implementation for Technology. Principles and practice of implementing innovations into real-world settings and evaluating their effectiveness. Taught off-campus only. (3Sp)

6400. Resources for Technology. Acquisition and management of resources for technological innovation: proposal writing, financing of technological change, management of technology resources, and conduct of resource-related projects. Taught off-campus only. (3Sp)

6450. Instructional Product Development. Application of theory, principles, and practice of instructional technology to the design of instructional products. (3Sp,Su)

6460. Distance Education. Application of theory, principles, and practice of instructional technology in providing instruction to learners separated from the instructor by distance and/or time. Addresses characteristics, technologies, and current issues of distance education. Includes a project. Prerequisite: InsT 6250. (3F,Sp,Su)

6470. Performance Systems. Application of theory, principles, and practice of organizational systems and human competence in designing performance support systems, job aids, and just-in-time instruction. Includes a project. Prerequisite: InsT 6250. (3F,Su)

6480. Instructional Simulations. Application of theory, principles, and practice of instructional technology in designing model-centered experiential instruction for learners. Includes a project. Prerequisites: InsT 6080, 6250. (3Sp,Su)

6490. Instructional Technology in Adult Education. Application of theory, principles, and practice of instructional technology in providing instruction to adult learners. Includes a project. (3Sp)

6500. Instructional Development Tools. Detailed study of processes, tools, and techniques for guiding and aiding the instructional design process. Emphasizes tools aiding project management, analysis, and design. Prerequisite: InsT 6080. (3F,Sp,Su)

6510. Research and Evaluation in Instructional Technology. Detailed study of methodologies for needs assessment, product evaluation, validation, and research. Includes methodological models, data collection, and data interpretation for both formative and summative evaluation. Prerequisite: InsT 6080. (3Sp)

6750. Instructional Technology Workshop. Special training and experience in the latest concepts and innovations in instructional technology. Content changes reflecting the most recent topics and problems facing the profession. (1-4Su) ®

6770. Practicum in the Improvement of Instruction. A field-based program focused upon characteristics of effective teaching methodologies, teaching performance, curriculum decision making, value guidelines, and the characteristics of the learner. Taught on demand. (1-4) ®

6780. Instructional Technology Programs. Designed primarily as an in-service experience for teachers, trainers, administrators, and instructional technology personnel; to improve local programs and services. Taught on demand. (1-3) ®

6790. Instructional Technology in Education and Training. Offered on request to instructional designers, teachers, administrators, and media personnel who have special needs related to instructional technology and seek assistance in improving their local programs. (1-3) ®

6800. Projects in Instructional Technology. Guided experience in completing an increasingly complex series of instructional development projects. Prerequisites: InsT 6080, 6250. (3F,Sp,Su)

6810. Research Seminar. Provides opportunity for exchange of ideas by Instructional Technology master's students pursuing a Plan A option. Discussion of publications, products, conventions, and guest speakers. Students must register all semesters they are in residence. (1F,Sp,Su) ®

6870. Current Issues Seminar. Allows exploration of new cutting-edge topics in the field. Topics vary and are announced the semester prior to registration. Topics may be theory or practice based. (1-3F,Sp,Su) ®

6900. Independent Study. Individually directed study and projects. Prerequisite: Departmental permission. (1-6F,Sp,Su) ®

6910. Independent Research. Individually directed research. Prerequisite: Departmental permission. (1-6) ®

6940. Internship. An on-campus experience in the department or other centers/programs in which the student applies knowledge gained in the graduate program. May be used as culminating experience for the MS, Plan C, providing internship is full-time. (1-6F,Sp,Su) ®

6950. Externship. Students select an appropriate full-time externship with an off-campus business, educational organization, corporation, or government agency. May be used as culminating experience for the MS, Plan C. (1-6F,Sp,Su) ®

6960. Creative Project. Individual experience in instructional product development, including a report of the process. Used as the culminating experience for the MEd and MS Plan C. (1-6F,Sp,Su) ®

6970. Thesis. Individual work in MS thesis and Plan B report writing with guidance and criticism. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. Allows students access to faculty and facilities to complete graduate thesis, project, and papers. (1-8F,Sp,Su) ®

7000. Pro-seminar I in Instructional Technology. Lectures and discussions on advanced topics in instructional technology and related disciplines. Led by selected faculty. Required for Instructional Technology EdS and PhD students. InsT 7010 should be taken the following semester. Includes 30 lectures and 2 comprehensive exams. Enrollment limited to Instructional Technology Specialist and PhD students. (3F)

7010. Pro-seminar II in Instructional Technology. Lectures and discussions on advanced topics in instructional technology and related disciplines. Led by selected faculty. Required for Instructional Technology EdS and PhD students. Must be taken the next semester following InsT 7000. Includes 30 lectures and 2 comprehensive exams. Enrollment limited to Instructional Technology Specialist and PhD students. Prerequisite: InsT 7000. (3Sp)

****7140. Designing Instructional Design Systems.** Advanced seminar critiquing approaches to systematic instructional design. Emphasizes requirements for synthesizing new or improved approaches, processes, and procedures. Prerequisite for MS students: Instructor's approval. (3Sp)

****7150. Advanced Instructional Design Theory.** Advanced seminar reviewing and critiquing current instructional design theories and models. Emphasizes synthesis of new or improved instructional design theory. Prerequisite for MS students: Instructor's approval. (3F,Sp)

***7160. Advanced Learning Theory in Instructional Technology.** Advanced seminar exploring, critiquing, and synthesizing the latest concepts in learning theory as they relate to knowledge and affective changes in the learning process. Prerequisite for MS students: Instructor's approval. (3F)

***7170. Designing Instructional Technology Tools.** Advanced seminar exploring, critiquing, and synthesizing design and production tools in instructional technology. Emphasizes design and development of new instructional technology tools. Prerequisite for MS students: Instructor's approval. (3Sp)

7180. Advanced Techniques for Instructional Technology Production. Advanced seminar exploring and critiquing production techniques in instructional technology. Emphasizes inventing or exploring innovative approaches to media resource production. Prerequisite for MS students: Instructor's approval. (3Sp)

7190. International and Multicultural Aspects of Instructional Technology. Advanced seminar examining principles and practices of instructional technology implementation for diverse populations. Emphasizes discovering innovative approaches with appropriate technologies. (3Su)

7200. Advanced Research in Instructional Technology. Advanced study of research which supports instructional development theory, practices, and procedures, including content structure, course organization, course sequence, and instructional strategies. Enrollment limited to Instructional Technology EdS and PhD students only. (3F)

7450. Internship in Program Evaluation. Experience in practical aspects of program evaluation through planned, supervised evaluation project. Participation must be approved by student's supervisory committee. (1-4F,Sp,Su) ®

7460. Internship in Research. Experience in conducting research through planned, supervised evaluation project. Participation must be approved by student's supervisory committee. (1-4F,Sp,Su) ®

7810. Research Seminar. Opportunity for exchange of ideas by EdS and PhD students, including reports on 78xx projects, and dissertation proposals. Discussion of publications, products, conventions, and guest speakers. Students must register all seminars while they are in residence. (1F,Sp,Su) ®

7820. Funding Proposal Practicum. Preparation of project funding proposal for submission to a funding agency. Prerequisite: InsT 7810 (must be taken concurrently). Enrollment limited to Instructional Technology EdS and PhD students only. (2F,Sp,Su)

7830. Instructional Product/Research Review Practicum. Development of a professional paper for publication, providing a systematic critique and synthesis of related research papers or ID products. Prerequisite: InsT 7810 (must be taken concurrently). Enrollment limited to Instructional Technology EdS and PhD students only. (2F,Sp,Su)

7840. Instructional Product Development Practicum. Development of a functional prototype of a tool for use in developing an instructional product. Product must include a sample instructional product showing evidence of systematic design and development procedures. Prerequisite: InsT 7810 (must be taken concurrently). Enrollment limited to Instructional Technology EdS and PhD students only. (2F,Sp,Su)

7850. Instructional Evaluation Practicum. Design and evaluation of an instructional product or process. Acceptable empirical evaluation methodology must be used. Must include data collection, analysis, and a written report for publication.

Prerequisite: InsT 7810 (must be taken concurrently). Enrollment limited to Instructional Technology EdS and PhD students only. (2F,Sp,Su)

7860. Instructional Empirical Investigation Practicum. Investigation of a general question or hypothesis related to instructional technology. Students must design, collect, and analyze data, and write a report for publication. Prerequisite: InsT 7810 (must be taken concurrently). Enrollment limited to Instructional Technology EdS and PhD students only. (2F,Sp,Su)

7870. Current Issues Seminar. Allows exploration of new cutting edge topics in the field. Topics vary and are announced the semester prior to registration. Topics may be theory or practice based. (1-3F,Sp,Su) ®

7900. Independent Study. Individually directed study and projects. Prerequisite: Departmental permission. (1-6F,Sp,Su) ®

7910. Independent Research. Provides for individually directed research. Prerequisite: Departmental permission. (1-6F,Sp,Su) ®

7920. College Teaching Seminar. Develops skills and knowledge necessary for college teaching. Activities are designed to help participants in a variety of areas, including instructional development and presentation skills development. (1-3F)

7960. Practicum, Educational Specialist. Culminating project/externship in partial fulfillment of the Educational Specialist degree. (1-9F,Sp,Su) ®

7970. Dissertation. Individual work on research problems in the PhD program. (1-18F,Sp,Su) ®

7990. Continuing Graduate Advisement. Allows graduate students access to faculty and facilities to complete graduate dissertation. (1-8F,Sp,Su) ®

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*Taught during odd-numbered years.

**Taught during even-numbered years.

[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Intensive English Language Institute

College of Humanities, Arts and Social Sciences

Director: Principal Lecturer *Franklin I. Bacheller*
Office in Main 067, (435) 797-2081

Assistant Director: Principal Lecturer *Lee Ann Rawley*
Office in Main 067, (435) 797-2081

Principal Lecturers *Jim Bame, Susan Carkin, Glenda R. Cole, Ann E. Roemer, James R. Rogers, II, Thomas J. Schroeder*; **Temporary Lecturer** *Beth Lynne Kozbial*

Objectives

The Intensive English Language Institute (IELI) is an academic program in the College of Humanities, Arts and Social Sciences. IELI teaches international students, residents, and refugees the English skills and cultural knowledge they need to be successful university students. IELI also trains international teaching assistants for USU.

The IELI program accepts students seeking a degree at Utah State University, as well as students who want to study English for personal or professional reasons. Students studying English *only* must meet admission requirements comparable to requirements for degree-seeking students.

Undergraduate students who apply to USU without a TOEFL score of at least 500 and graduate students applying without a minimum 550 TOEFL score must take the IELI Placement Examination, given the first day of each semester, including summer semester. Based on the examination results, students will be recommended for study in the IELI or exempted from further study and permitted to take classes in their major fields.

Curriculum

Four levels of study are offered each semester. The ability levels of classes range from elementary through advanced. Several of the level 1 and 2 classes are combined into multilevel classes. Classes focus on listening, speaking, reading, writing, and cultural skills. Upon successful completion of the advanced level (level 4), students are permitted to register for full-time study in major field classes. Students at level 4, who have less than a full course load remaining in IELI, may take major field courses. The total number of IELI credits and major field credits taken during a semester may not exceed 16. Exceptions to this policy must be approved by the director of IELI in consultation with students' major field advisers.

Credit for Intensive English Study

Classes in IELI carry three academic credits. Full-time students at each level take six classes and receive a maximum of 18 credits per semester. A student who begins IELI at level 1 and progresses to level 4 may earn a total of 72 undergraduate elective credits. All of these credits will appear on the student's transcript. However, the number of credits that count toward graduation varies by department. Students must, therefore, meet with their departmental advisers to determine the role of IELI credits in their graduation requirements.

Area Studies Certificate

The Intensive English Language Institute administers a College of Humanities, Arts and Social Sciences area studies certificate in Communicating Across Cultures. This certificate

program is designed to prepare students to work and live in the global community. Students, both international and American, gain cross-cultural experience within an academic framework by taking language and culture-related classes which broaden and enhance applied cross-cultural experiences. For more information, contact the Intensive English Language Institute.

Services

New students in IELI take the Placement Examination and attend an orientation meeting prior to the beginning of each semester. All students are assigned an adviser in IELI who helps them with various difficulties they may encounter. In addition, all the services and privileges offered to students on campus are available to IELI students. These services include health care services, recreational opportunities, and numerous special programs for international students.

Intensive English Language Institute Courses (IELI)

1210. Reading. Multilevel course designed to build basic and intermediate-level reading skills. Students read texts individually and collaboratively. Focuses on active reading (i.e., making use of background knowledge, predicting, and critically assessing reading passages). Repeatable for credit for students who placed at basic level on IELI placement exam. (3F,Sp,Su) ®

1220. Writing from Sources. Multilevel course focusing on sentence and paragraph writing. Students gather information from various sources, transform and organize it, and present it in both verbal and written form. Repeatable for credit for students who placed at basic level on IELI placement exam. (3F,Sp,Su) ®

1230. Cross-Cultural Talk Low-Intermediate. Multilevel course designed to improve oral communication through one-on-one conversation, small group work, and short presentations. Emphasizes interactive language fluency. Repeatable for credit for students who placed at basic level on IELI placement exam. (3F,Sp,Su) ®

1240. Integrated Skills. A multi-level course designed to develop intermediate language learning skills through content-based instruction. Repeatable for credit for students who placed at the basic level on the IELI placement exam. (6F,Sp,Su) ®

2310. Comprehending Authentic Texts. Introduction to listening and reading strategies focusing on organization and information. Develops strategies for listening to authentic passages, such as news, documentaries, etc., and for reading general periodicals and Internet articles. (3F,Sp,Su)

2320. Writing and Reading Authentic Texts. Designed to improve academic writing and reading skills. Diverse rhetorical styles introduced through writing based on authentic reading content. Reading focuses on using strategies to get information from texts. (6F,Sp,Su)

2330. Cross-Cultural Talk High-Intermediate. Emphasizes interpersonal communication in conversational tasks with American teaching fellows. Focuses on negotiation of meaning, attending, comprehending, and self-expression in informal and academic settings. (3F,Sp,Su)

2340. Spoken Discourse for Second Language Learners. Focuses on communicating one's intentions. After speaking extemporaneously on various general and academic topics, students are critiqued for comprehensibility, grammaticalness, and pronunciation. (3F,Sp,Su)

2410. Listening and Reading for Academic Purposes. Develops strategies for understanding language of university classrooms and academic texts. Focuses on information processing. Students listen to planned and unplanned academic discourse and read related academic texts. (3F,Sp,Su)

2420. Writing and Reading from Academic Sources. Introduction to various academic writing demands. Students read and analyze academic texts and write papers based on information in the texts. (6F,Sp,Su)

2430. Cross-Cultural Perspectives of American Culture. Provides understanding of what culture is and how it influences behavior and beliefs. Provides cross-cultural perspective on American value system and American institutions. (3F,Sp,Su)

2440. Academic Discourse. Designed to assist students in developing oral competency, with emphasis on comprehensibility, in interpersonal and academic settings. Students perform tasks individually and in small groups. (3F,Sp,Su)

2450. Topics for ESL. Introduction to contemporary topics in culture and language. Focuses on language development through content-based instruction. Repeatable for up to 12 credits. (3F,Sp,Su) ®

7920. College Teaching Seminar. Workshop designed for international students who will hold teaching assistantships at the University. To be accepted into the workshop, students must take a qualifying language test. (1-3F,Sp) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Interdisciplinary Studies Major

Program Director: Professor *H. Craig Petersen,* Vice Provost, Provost's Office, Main 114, (435) 797-1167

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA)

Objectives

The organization of academic departments and their associated degree programs reflects the history and traditions of study in those fields. The Interdisciplinary Studies major is intended to serve the needs of students who want to design a unique individualized academic program, obtain a broadly-based education, and diversify their professional potential. The degree is not intended to replace existing majors or curricula. Rather, it is designed to provide the small number of students whose degree needs cannot be met with other majors with a program which is less restrictive and more responsive to their individual plans and interests. Students who complete their programs will receive the Bachelor of Science or (if they meet the language requirement) the Bachelor of Arts degree. The degree cannot be used as part of a dual/double major.

Application

Students may apply for admission to the Interdisciplinary Studies program after completing a minimum of 45 credits. Students who wish to pursue this degree must submit a letter of application to the Provost's Office. The letter must include the

folowing information: (1) a clear statement of the student's educational objectives, (2) a proposed program of study which includes the specific courses, and (3) a brief statement explaining why the program is worthy of a college degree. A current transcript must also be included.

The application will be reviewed in the Provost's Office to determine (1) that the proposal represents a coherent and carefully planned program of study and (2) that space is available in the courses proposed for the program. After approval, the Provost's Office will forward the application to the dean of the college most closely related to the theme selected by the student. The dean will assign an adviser who will assist the student in completing the program.

Requirements

With guidance and approval from a faculty adviser, the student selects and completes at least 45 credits of coursework for the major. Courses used to meet the 45-credit requirement may come from any department with the following restrictions:

1. At least 24 of the 45 credits in the major must be taken at the 3000 level or above.

2. Courses used for the major must include at least 15 credits each from two different academic disciplines.

3. The selection of the courses in the major must focus on an overarching theme and be consistent with the student's educational and career goals.

4. As part of the 45 credits, the student must complete a 3-credit senior project.

5. Courses used for University Studies (General Education) may not be counted toward the 45 credits.

6. Students must pass every course approved in the program of study and earn a composite GPA of at least 2.0 in the 45 credits of courses used for the major.

International Studies Major and Minor

Program Director: Professor *H. Craig Petersen*, Vice Provost, Provost's Office, Main 114, (435) 797-1167

Degrees offered: Bachelor of Arts (BA), Joint BA with Disciplinary Major

Overview

Students majoring in International Studies select one of two tracks. The **Breadth Track** is intended for students who want a broad exposure to international studies. Students must take 24 credits of core and elective courses, complete a departmental minor, complete three years of language study, spend at least eight weeks living in a foreign country, and complete a senior project. Students who complete their programs will receive the Bachelor of Arts degree.

The **Depth Track** is pursued as part of a joint major and is intended for students who want to tie their disciplinary skills to an in-depth study of a particular area of the world. Requirements are similar to those for the Breadth Track, except that courses, study abroad, the senior project, and the disciplinary major must be structured to complement one another. Students who complete their programs will receive a joint Bachelor of Arts degree in International Studies *and* the disciplinary major.

The **International Studies minor** requires 12 credits of international studies courses and one year of language study.

Application

Students who wish to pursue an International Studies major must submit a letter of application to the Provost's Office. The letter must include the following information: (1) a clear statement of the student's educational objectives, (2) a proposed program of study which includes the specific courses, and (3) a brief statement explaining why the program is worthy of a college degree.

The application will be reviewed in the Provost's Office to determine (1) that the proposal represents a coherent and carefully planned program of study and (2) that space is available in the courses proposed for the program.

Breadth Track. After approving the program of study, the Provost's Office will forward the application to the dean of the college most closely related to the breadth track program proposed by the student. The dean will assign an adviser who will assist the student in planning and completing the program.

Depth Track. The Provost's Office and the department where the other major will be pursued must **both** approve the proposed depth track program of study. The major department will assign an adviser who will assist the student in planning and completing the dual major.

Minor. The International Studies minor will be approved by the Provost's Office.

Requirements

Breadth Track Major. This track of the International Studies major is intended for students who want breadth in their undergraduate studies. Requirements are as follows:

1. Completion of 24 credits, including 12 credits of international studies core courses and 12 credits of international studies electives. At least 12 of the 24 credits must be at the 3000 level or above. A list of international studies core and elective courses may be obtained from the Provost's Office or from the Science/HASS Advising Center in SC 304.

2. Completion of a departmental minor (other than a foreign language minor).

3. Three years (22 credits) of foreign language study or demonstration of equivalent proficiency.

4. A minimum of eight weeks living in a foreign country or countries. To qualify, this experience should assist the student in meeting the educational goals of the proposed program of study.

5. Completion of a senior project focusing on international issues or problems relating to one or more foreign countries. (Three credits are allowed for the senior project.)

6. Passing grade received in every course approved for the program of study and composite GPA of at least 2.5 in the major.

Depth Track Major. This track of the International Studies major is pursued as part of a joint major. It is intended for students desiring to tie their disciplinary skills to an in-depth study of a particular area of the world. For example, by completing both sets of requirements, a student could obtain a BA in Economics and International Studies. Requirements are as follows:

1. Completion of 24 credits, including 12 credits of international studies core courses and 12 credits of international studies electives. At least 12 of the 24 credits must be at the 3000 level or above. A list of international studies core and elective courses may be obtained from the Provost's Office or from the Science/HASS Advising Center in SC 304.

2. Three years (22 credits) of study in a single foreign language or demonstration of equivalent proficiency.

3. A minimum of eight weeks living in a country where the chosen foreign language is spoken. To qualify, this experience should enhance the student's understanding of her or his major discipline.

4. A senior project involving both the student's discipline and the country selected by the student in requirement #3. (Three credits are allowed for the senior project.)

5. With the exception of language credit, no double counting of courses is allowed between the disciplinary and the International Studies majors.

6. Passing grade received in every course approved for the program of study and composite GPA of at least 2.5 in the major.

Minor. Requirements for the International Studies minor are as follows:

1. Completion of 12 credits of international studies core courses. A list of international studies core courses may be obtained from the Provost's Office or from the Science/HASS Advising Center in SC 304.

2. One year (8 credits) of foreign language study or a demonstration of equivalent proficiency.

3. With the exception of language credit, no double counting of courses between the disciplinary major and the international studies minor is allowed.

4. Passing grade in every course approved for the program of study.

Department of
Landscape Architecture and Environmental Planning

College of Humanities, Arts and Social Sciences

Head: Professor *Richard E. Toth*, landscape analysis, design theory, water resources planning
Office in Fine Arts Visual 230, (435) 797-0500

Undergraduate Program Coordinator: Associate Professor *Vern J. Budge*, landscape construction, recreation planning

Graduate Program Coordinator: Professor *Craig W. Johnson*, planting design, land rehabilitation, wildlife habitat planning and design

FAX (435) 797-0503
E-mail apoulsen@wpo.hass.usu.edu
WWW http://www.usu.edu/~laep/

Associate Professors *John C. Ellsworth*, visual resources management, computer applications; *John K. Nicholson*, urban and regional planning; *Michael L. Timmons*, site planning and history of landscape architecture; **Adjunct Associate Professors** *Dale J. Blahna*, Forest Resources Department; *Mark W. Brunson*, Forest Resources Department; *Thomas C. Edwards, Jr.*, Fisheries and Wildlife Department;

Robert H. Schmidt, Fisheries and Wildlife Department; **Assistant Professors** *David L. Bell*, residential and urban design; *Caroline Lavoie*, urban design/theory; **Adjunct Instructor** *Paul G. Hawken*

Affiliated Faculty: The following individuals maintain an active association with the department through studio presentations, guest lectures, seminars, serving as members of thesis committees, and Environmental Field Service projects.
Professors *John A. Kadlec*, Fisheries and Wildlife Department; *John E. Keith*, Economics Department; *Richard S. Krannich*, Sociology, Social Work and Anthropology Department; *James A. MacMahon*, Dean, College of Science; **Associate Professor** *Joanna L. Endter-Wada*, Natural Resources Policy Program; **Assistant Professors** *Barrie K. Gilbert*, Fisheries and Wildlife Department; *Sarah J. Northerner*, Art Department

Degrees offered: Bachelor of Landscape Architecture (BLA) and Master of Landscape Architecture (MLA); Master of Science (MS) in Town and Regional Planning. The BLA and first professional MLA programs are fully accredited by the American Society of Landscape Architects.

Graduate specializations: *MLA*–Land Rehabilitation/Revegetation, Small Town Rehabilitation, Urban Wildlife, Visual Resource Management, Water Resources

Undergraduate Programs

Objectives

The objectives of the department are to (1) provide an educational and technical program responsive to current needs and demands resolution of problems related to environmental planning and design; (2) maintain a balance in the student's professional education, so that he or she may be made fully aware of future professional opportunities in the broadest sense and not just one oriented to technical service; (3) continue the development of the program within the context of interdisciplinary coordination with the colleges of Natural Resources, Science, Engineering, Agriculture, and Humanities, Arts and Social Sciences; and (4) research, develop, and test new theories, methods, and tools needed to assist landscape architects in a clearer and deeper understanding of our relationship to the environment.

Admission and Graduation Requirements

The requirements for admission and graduation are commensurate with those established in the first part of this catalog (see pages 43-46). The only additions to the University requirements which the department maintains are with regard to matriculation into the upper-division (junior and senior years).

Students must attain sophomore status within the department prior to applying for permission to continue on in upper-division courses.

Courses required for matriculation into upper division are: LAEP 1200, 1350, 2300, 2600, 2650, 2700, 2720; PlSc 2620; Math 1050; and ITE 1200.

Students must complete the following courses as part of their eligibility for matriculation into the upper division: LAEP 1030, 1200, 1350, 2300, 2600, 2650, 2700, 2720; PlSc 2620; Math 1050; and ITE 1200.

In addition to the above required courses for matriculation, a student must have a University GPA of 2.5 or higher. At the end of spring semester, when both of these criteria have been met, eligible students will be ranked according to their grade point average, and the first 25 students will be matriculated into upper-division classes. The primary reasons for this evaluation are: (1) to maintain a high-quality educational experience for the student in upper division; and (2) to establish a reasonable faculty/student ratio to maintain the status of full accreditation by the American Society of Landscape Architects. Those students who are not allowed to take upper-division courses may return the following year and retake courses to improve their GPA and be considered again for the upper division.

After students are admitted into the upper division, their academic requirements are commensurate with those set out by the University *General Catalog*.

High school students planning to major in landscape architecture and environmental planning may obtain the necessary background with courses in art, natural sciences, social sciences, and math through trigonometry.

BLA Degree. The Bachelor of Landscape Architecture (BLA) degree is a four-year program consisting of courses relating to theory, design, history, and the various technical areas of the profession. This degree is fully accredited by the American Society of Landscape Architects. The degree provides a substantial basis for a professional career, as well as an excellent foundation for advanced graduate studies. In addition to the courses required for sophomore status, the following LAEP courses are required for the junior and senior years: LAEP 3100, 3120, 3130, 3300, 3500, 3510, 3610, 3620, 3700, 4100, 4120, and 4920. Non-LAEP courses required are: ASTE 3050, Geol 3100, FW 1200 or RLR/FW 2200, and Soc 3610 or 4620. Students must also complete the University Studies (General Education) requirements. For more detailed information on requirements, see major requirement sheet available from the department.

Specialized Service Courses. LAEP 1030, 1200, 1350, 2300 and 3700 are available for majors in other fields who may wish to gain an exposure to the different aspects of landscape architecture and environmental planning. A minor is not given in LAEP; however, these service courses are available, without prerequisites, for those requesting them.

Graduate Programs

Admission Requirements

The application deadline for fall semester is March 15. For general admissions requirements, see pages 60-61 of this catalog.

Master of Landscape Architecture

The program for the Master of Landscape Architecture (MLA) emphasizes both traditional subjects of the discipline and emerging areas of the profession, such as large-scale landscape analysis, planning, and design using computer-aided techniques.

The department offers two MLA programs: one for students who have previously earned baccalaureate degrees in landscape architecture from accredited programs and the other for individuals from other disciplines who would like to earn an MLA degree.

MLA-Advanced Professional Degree

The MLA-Advanced Professional Program is a two-year program of study. Applicants must hold baccalaureate degrees in landscape architecture from accredited programs. The advanced program allows outstanding students to expand their knowledge in areas of special interest under the supervision of a major professor and supervisory committee.

Course of Study. The graduate program coordinator advises all incoming students until they have selected a thesis topic. A major professor whose interests are closely aligned to those of the student (see *graduate specializations*) supervises thesis work. A minimum of 30 graduate-level credits, including 6 credits of thesis work, is required. Students supplement requirements with courses recommended by the major professor and supervisory committee.

Core Courses. The core courses for the two-year program are as follows:

First year: *fall semester:* LAEP 6100, 6740, 6860, 6910, and 3 elective credits; *spring semester:* LAEP 6120, 6750, 6890, 6930, and 7 elective credits.

Second year: *fall semester:* LAEP 6960 or 6970 (2 credits) and 6 elective credits; *spring semester:* LAEP 6960 or 6970 (4 credits) and 6 elective credits. During this year, FW 5400, 5750, or 6700 is required.

MLA-First Professional Degree

A three-year program leading to the MLA is available for candidates with previous baccalaureate degrees in fields other than landscape architecture. The core curriculum comprises a two-year lecture and studio sequence designed to prepare the student in fundamental professional skills.

The department requires a minimum of 30 graduate-level credits, including at least 6 credits of work on a thesis. An outside area of emphasis may be pursued by concentrating electives in another program such as forestry, rangeland resources, forest recreation resources, bioclimatology, geology, water resources, behavioral sciences, or history.

Core Courses. Students in the three-year program are required to complete the following courses:

First year: *fall semester:* LAEP 1200, 2300, 2600, 2700 (sec. 2), 6860, and PlSc 2620; *spring semester:* LAEP 1350, 2720, 6890, Biol 2220, and 3 elective credits. During this year, FW 5400, 5750, or 6700 is required.

Second year: *fall semester:* LAEP 3100, 3500, 3610, 6910, and 7 elective credits; *spring semester:* LAEP 3120, 3130, 3510, 3620, 6750, 6930 and 3 elective credits.

Third year: *fall semester:* LAEP 6100, 6160, 6740, and 2 credits of LAEP 6960 or 6970; *spring semester:* LAEP 6120, 4 credits of LAEP 6960 or 6970, and 3 elective credits.

Recommended electives: ITE 1200, Soc 3610, Geol 3100, Phil 3510. Selection of electives should be negotiated between the student and major professor. Electives should be related to thesis or terminal project content. At least 3 elective credits must be at the 5000 or 6000 level.

Master of Science in Town and Regional Planning

The curriculum for the MS presents a broad approach to planning. Emphasis is placed on problem analysis, planning theory and methods, policy development, planning law, physical planning, and economic development. The focus is on planning for large areas with dispersed populations and a primary economic base in agriculture, energy development, recreation, or natural resources.

Core Courses. The core courses for this two-year program are as follows:

First year: *fall semester:* LAEP 6100, 6740, 6860, Econ 5850/6850, and 3 elective credits in Computer Science; *spring semester:* LAEP 6120, 6750, 6890, and 6 elective credits.

Second year: *fall semester:* LAEP 6910, 6960 or 6970, and 6 elective credits; *spring semester:* LAEP 6960 or 6970, and 6 elective credits.

Selection of electives should be negotiated between the student and major professor. Electives should be related to thesis or terminal project content.

Environmental Field Services

Practical Education and Community Service. The department sponsors a program of planning and design services in which MS, MLA, and BLA students may participate. The Environmental Field Service program offers students the opportunity to interact with community leaders and citizens and to test concepts and skills acquired in the classroom while working on real projects.

Internships and Cooperative Education

Many students take advantage of the practical learning (and income) available through internships and cooperative education programs. The department, together with the student and the governmental agency or private firm, makes the necessary arrangements.

Financial Assistance

The application deadline for scholarship consideration is January 1. Acceptance to pursue graduate study does not guarantee the student financial assistance.

Career Opportunities

The Department of Landscape Architecture and Environmental Planning provides education for careers in site planning, design, and management of town, rural, and wilderness environments of the West. Graduates are employed by local, state, and federal agencies, as well as by private sector professional firms. LAEP graduates also find employment in academia at both the undergraduate and graduate levels.

Landscape Architecture and Environmental Planning Courses (LAEP)

BCA 1030. Introduction to Landscape Architecture. Environment as a basis for land use and design decisions. Topics discussed include environmental awareness, the planning process, and design related to home, community, and the region. Three one-hour lectures per week. (3F,Sp) ©

1200. Basic Graphics in Landscape Architecture. Graphic techniques for landscape architectural drawings, including plans, elevations, isometrics, perspective, rendering, and model construction. Various media explored for preparing drawings and sketches for presentation. Two three-hour studios per week. (4F)

1350. Theory of Design. Basic elements of design with emphasis upon their relationship to landscape architecture. Form and spatial relationships are stressed through student development of two- and three-dimensional design models. Design theory applied to materials of landform, vegetation, water, and architecture. Two three-hour studios per week. (4F)

2250. Internship and Cooperative Education. Course credit for professional experience outside the classroom prior to graduation. A statement of professional goals and a summary report following the experience are required. (1-5) ®

2300. History of Landscape Architecture. An examination of landscape change in the context of its history from ancient to present times, with a primary emphasis on the visual qualities of designed landscapes. Three one-hour lectures per week. (3F)

2600. Landscape Construction I. Introduction to site engineering, grading, cut and fill calculation, stormwater drainage, and erosion control. Two one-hour lectures and two two-hour studios per week. Prerequisite: LAEP 1200. (4F)

2650. Architecture and the Built Environment. Exploration of architectural form and structure in exterior environments. Emphasis placed on space created by architectural forms and their relationship to the surrounding landscape. Energy and water conservation measures with respect to the built environment. Prerequisite: LAEP 1350. (4Sp)

2700. Site Analysis and Design. Site survey, analysis, and design synthesis. Focuses on human behavior as a design consideration for future land use planning. Student teams survey and analyze a site's landscape and cultural resources for future land use planning. Prerequisite: LAEP 1350. (5F)

2720. Site Planning and Design. Serves as a capstone course, synthesizing lower-division landscape architecture coursework and applying that knowledge to site scale design projects. Includes units on design methodology, site planning and circulation, and creative problem solving. Three three-hour studios per week. Prerequisite: LAEP 2700. (5Sp)

3100. Recreation/Open Space. Focuses on regional and urban open space planning and design including project scale recreation design. Includes design seminars, field trips, and guest lecturers. Two lecture periods and six hours of labs per week. Prerequisite: LAEP 2720 or permission of instructor. (5F)

3120. Residential Planning and Design. Focuses on large-scale residential projects, planned unit developments, and community facilities. Two lecture periods and six hours of labs per week. **This course meets for the first seven weeks of the semester.** Prerequisite: LAEP 3100. (5Sp)

3300. Advanced Computer Applications in Landscape Architecture. Emphasizes the major analytical and technical components of large-scale resource planning and design. Computer techniques are used in the studio. Two lecture periods and four hours of labs per week. Prerequisite: LAEP 2720 or instructor's permission. (4F)

3500. Planting Design I. Emphasizes plant and environment relationships and plant community dynamics as they relate to planting design. In addition, basic planting design principles will be introduced. Two lectures plus two three-hour labs per week. **Meets for the first seven weeks of the semester.** (2F)

3510. Planting Design II. Involves the application of planting design principles to a variety of project types. One segment of the course will focus on land reclamation planting in nonirrigated landscapes. **Meets for the first seven weeks of the semester.** Prerequisite: LAEP 3500. (2Sp)

3610. Landscape Construction II. Introduction to construction materials, wood construction, and free-standing and retaining walls. Two one-hour lectures and two two-hour studios per week. **Meets for the second seven weeks of the semester.** Prerequisite: LAEP 2600. (2F)

3620. Landscape Construction III. Introduction to layout and dimensioning, basic theory and technical aspects of roadway alignment, and theory and design of sprinkler irrigation. Two one-hour lectures and two two-hour studios per week. **Meets for the second seven weeks of the semester.** Prerequisite: LAEP 3610. (2Sp)

3700. City and Regional Planning. Introduction to historic and current theory and methods of city and regional planning. Includes legislative, administrative, and implementation practices of the general comprehensive plan. Three lectures per week. (3Sp)

4100. Urban Theory, Systems, and Design. Emphasizes historical, cultural, and functional aspects of the city. Planning and design activities focus on social and behavioral contributions to urban form. Two lecture periods and six hours of labs per week. Prerequisite: LAEP 3120. (5F)

4110. Construction Document Preparation. Design project through detail design development and completion of the working drawings and specifications. **This course meets for the second seven weeks of the semester.** Prerequisite: LAEP 3120. (4F)

4120. Emerging Areas in Landscape Architecture. Exploration of new and emerging areas in the profession of landscape architecture. National and international issues in regional landscape planning, landscape restoration/bioengineering, and visual resource management are among several issues which may be examined. Two lecture periods and six hours of labs per week. Prerequisite: LAEP 4100. (5Sp)

4250. Internship and Cooperative Education. Course credit for professional experience outside the classroom prior to graduation. Statement of professional goals and a summary report following the experience are required. (1-3F,Sp,Su) ®

4350. Travel Course. Major field trip to examine a variety of projects in planning and design. (1F) ®

4810. Tutorial. Directed readings and discussions of landscape issues. Prerequisite: Instructor's consent. (1F,Sp,Su)

4900. Special Problems. Selected problems to meet individual needs for student's completion of professional education. Hours arranged. Prerequisite: Instructor's consent. (1-5F,Sp,Su) ®

4920. Professional Practice. Readings and reports on current topics and trends in professional practice. Also covers contracts, specifications, professional ethics, and general office management. (1F)

4950. Seminar. Directed readings and reports on current and emerging areas of professional practice. Areas of study include both national and international projects. One recitation hour per week. (1F,Sp,Su)

6100. Regional Landscape Analysis and Planning. Landscape planning theory, methods, and case studies focusing on analysis of major physiographic region. Alternative planning scenarios are proposed, including their evaluation. (5F)

6120. Regional Landscape Policy and Implementation. Case studies and implementation strategies for planning alternatives developed in LAEP 6100. Addresses issues of landscape restoration and bioengineering. (5Sp)

6160. Professional Practice. Assigned readings and reports on current topics and trends in the practice of landscape architecture and environmental planning. (2F)

6250. Internship and Cooperative Education Program. Course credit given for professional experience outside the classroom prior to graduation. Statement of professional goals and summary report following the experience are required. (1-3F,Sp,Su) ®

6740. Planning Theory and Methods. Review of planning theory and implementation techniques based on advanced readings, case studies, and research projects. Scale of material proceeds from regional landscape planning to rural and town planning. (3F)

6750. Implementation and Regulatory Techniques in Planning. Analysis of techniques utilized to implement the comprehensive plan. Major topics include zoning, capital improvements, subdivision regulations, code enforcement, and growth controls. (3Sp)

6860. Faculty/Interdisciplinary Seminar. Landscape architecture and planning program options and research potential presented by departmental faculty. Also introduces students to other interdisciplinary programs and faculty within the University. (1F)

6890. Seminar on Research Methods and Thesis Proposals. Explores various research methods from both case studies and faculty presentations. Also includes preparation of thesis proposals and abstracts. (1Sp)

6900. Special Problems. Selected problems to meet individual student interests and areas of concentration. Registration by permission of departmental faculty. (1-5F,Sp,Su) ®

6910. Readings Seminar: Design. Readings in landscape perception, creativity, and design process. (1F)

6930. Readings Seminar: Planning. Readings in the social and behavioral contributions to landscape design within the context of regional, urban, and rural cultures. (1Sp)

6960. Master's Project. Requires research, analysis, and production of a given subject area, including its final planning, design, and documentation. (1-6F,Sp,Su) ®

6970. Thesis Research. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-2F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of

Languages and Philosophy

College of Humanities, Arts and Social Sciences

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Office in Main 204, (435) 797-1209

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Professors *Lynn R. Eliason*, 19th century Russian and German novels, Russian culture; *Charles W. Johnson*, philosophy of mind, Wittgenstein, logic, philosophical methods; *Hans K. Mussler*, German literature, Lessing, Enlightenment, translation, teaching methodology; *Kent E. Robson*, ethics, philosophy of language, history of philosophy, philosophy of science, philosophy of religion; *Richard Sherlock*, medical and environmental ethics, ethical theory, ethical issues in genetics, political philosophy, philosophy of religion; *Alfred N. Smith, Jr.*, French, foreign language education, cross-cultural studies; **Associate Professors** *M. Isela Chiu*, Spanish, Portuguese, Latin American literature; *Ilona Jappinen*, German language, literature and culture, Nietzsche/expressionism; *Harold J. Kinzer*, organizational communication; *Mark D. Larsen*, Latin American literature, computer applications in languages; *Renate Posthofen*, German language and literature, contemporary culture and film; *Norman R. Savoie*, contemporary French culture, contemporary French detective fiction; *Gordon Steinhoff*, philosophy of science, logic, metaphysics; *Janet C. Stock*, French, business French, 20th century French literature, Proust; *Fuencisla Zomeño*, Spanish and Luzo-Brazilian literature; **Associate Professors Emeritus** *Jerry L. Benbow*, Peninsular Spanish literature and grammar; *John M. Beyers*, German, aesthetics, value theory; *Lynne H. Goodhart*, 20th century French poetry, women in literature; *Gordon E. Porter*, Spanish, Spanish literature, Portuguese; **Assistant Professors** *María-de Jesús Cordero*, colonial Spanish-American literature; *Maria del Carmen Faccini*, Latin American literature; *Garett R. Heysel*, 20th century French literature; *Charles D. Huenemann*, history of modern philosophy, Kant, metaphysics; *Taira Koybaeva*, Russian, linguistics, international marketing and business relationships; *Vincent Martin*, Spanish Golden Age literature; *John S. Seiter*, interpersonal communication, intercultural relations, social influence; **Assistant Professor Emeritus** *Valentine Suprunowicz*, Russian literature; **Principal Lecturer** *William H.*

Wilcox, Jr., ethical theory, applied ethics, philosophy of law, social and political philosophy; **Principal Lecturer Emeritus** *Viva L. Lynn*, Spanish literature; **Lecturers** *Nancy R. Birch*, interpersonal communication, public speaking; *Kevin L. Krogh*, Spanish Peninsular literature; *Atsuko Neely*, Japanese, second language acquisition

Degrees offered: Bachelor of Arts (BA) in French, German, Spanish, and Philosophy; Bachelor of Science (BS) in Philosophy; Master of Second Language Teaching (MSLT)

Undergraduate Programs

Mission Statement

The Department of Languages and Philosophy offers programs in modern languages and literature, philosophy, and speech communication. While these programs differ widely in their curricula, they are bound together by two considerations: (1) an emphasis on humanistic content and method of inquiry; and (2) a recognition on the part of the departmental faculty that a critical part of becoming an educated person lies in achieving a greater understanding of one's self and of others, an understanding opened up through insight into the spoken and written word. Courses offered by the department provide majors and minors with opportunities to achieve this understanding by increasing their communicative, logical, interpretive, linguistic and research skills; their ability to function within an increasingly globalized society; and their awareness of ethical, aesthetic, and other values. Courses offered by the department also give teaching majors and minors the opportunity to serve the needs of the education professions. Through its participation in the University Studies program, the department provides all students with an opportunity to gain knowledge of how people come to understand themselves through their cultural, literary, and philosophical achievements. The department also furthers the education of both traditional and nontraditional students through faculty participation in interdisciplinary programs such as Honors, Liberal Arts and Sciences, Asian Studies, and Women's Studies; and in cooperative education, distance learning, extension, and study-abroad programs.

Admission Requirements

Admission requirements for freshmen desiring entrance to major programs offered by the Department of Languages and Philosophy are the same as those for Utah State University (see pages 43-46). Transfer students from other institutions and from other majors within Utah State University must have an overall minimum GPA of 2.5 to be admitted to the department's major programs.

All students majoring in programs offered by this department must maintain a minimum GPA of 2.5 in their major to be in good standing in the department and to obtain official approval for graduation.

Career Information

The Department of Languages and Philosophy maintains a resource center in the departmental office (Main 204) containing general information about graduate schools and nonacademic careers in modern languages, philosophy, and speech communication. Students are invited to use this resource center during office hours.

Scholarship Information

Three scholarships are offered through the Department of Languages and Philosophy. The **Carl T. Degener Memorial Scholarship** is awarded to an outstanding language major at the junior level. Outstanding upper-division students in French (and under some circumstances Spanish) are eligible for the **Jean Inness Scholarship**. The **Thain Scholarship** is awarded to an outstanding high school senior enrolling in a language or philosophy course at USU. For more details, contact the department office.

Languages

Language faculty members in the Department of Languages and Philosophy teach courses leading to undergraduate degrees in French, German, and Spanish, as well as to undergraduate minors in French, German, Japanese, Russian, and Spanish. Teaching majors and minors are also offered in French, German, and Spanish. Through in-class instruction and self-study, students can also pursue a minor in Portuguese. The department also offers a minor program in Linguistics.

French, German, and Spanish Major Programs. The goal of the French, German, and Spanish BA degree programs is to prepare students to be able to take advanced studies in these languages, literatures, and cultures; to be quality teachers of these languages, literatures, and cultures in the public schools; and to provide those who may enter other professions a solid grounding in these languages, literatures, and cultures, in order that they may function as members of the international community. The curricula supporting these goals includes courses in language, literature, civilization, culture, and linguistics. See the course requirements which follow.

Course Requirements

Language Major Requirements

Bachelor of Arts in French. *French Major (34 credits):* 30 credits of upper-division coursework in French, plus Ling 3000 and 3400; and other University Studies courses as required by the University. Ling 3400 must be taken before Fren 4200. *French Teaching Major (36 credits):* Ling 3400, 4190, 3300 or 4300, 4400; Fren 3040 or 4040, 3050 or 4050, 3060 or 4060; 18 credits selected from the following: Fren 3550, 3570, 3600, 3900, 4200, 4630, Ling 4920; and other University Studies courses as required by the University.

Bachelor of Arts in German. *German Major (34 credits):* Germ 3000, 3040, 3050; Ling 3000, 3400; plus 21 credits of additional upper-division coursework in German and other University Studies courses as required by the University. *German Teaching Major (36 credits):* Germ 3000, 3040, 3050, 4200; Ling 3400, 4190, 3300 or 4300, 4400; plus 15 credits of additional upper-division coursework in German, and other University Studies courses as required by the University.

Bachelor of Arts in Spanish. *Spanish Major (34 credits):* Span 3040, 3050; 3 courses from among the following: Span 3600, 3610, 3620, 3630; Span 3550 or 3570; Ling 3000, 3400, and three additional courses in Linguistics; plus 9 credits of upper-division coursework in Spanish or Linguistics and other University Studies courses as required by the University. *Spanish Teaching Major (36 credits):* Span 3040, 3050, 3550, 3570, 3600 or 3610, 3620 or 3630, 4200; Ling 3400, 4190, 3300 or 4300, 4400; plus 6 credits of upper-division coursework in Spanish or Linguistics, and other University Studies courses as required by the University.

Language Minor Requirements

French Minor. 12 upper-division credits in French, excluding Fren 3570.

French Teaching Minor. Fren 3040 or 4040, 3050 or 4050, 3600, 4200; Ling 4190, 3300 or 4300, 4400.

German Minor. Germ 3000, 3040, 3050, and one other upper-division German course.

German Teaching Minor. Germ 3040, 3050, 4200; Ling 4190, 3300 or 4300, 4400; plus one other upper-division German course.

Japanese Minor. 12 credits selected from the following courses: Japn 2020, 3010, 3020, 3510.

Portuguese Minor. Port 1020, 2010, 2020, 3040.

Russian Minor. Russ 3040, 3050, 3300, 3540.

Spanish Minor. Span 3040, 3550 or 3570; one of the following: Span 3600, 3610, 3620, 3630; plus one other upper-division course in Spanish or Linguistics.

Spanish Teaching Minor: Span 3040, 3550 or 3570, 4200; one of the following: Span 3600, 3610, 3620, 3630; Ling 3300 or 4300, 4400; plus 2 credits of upper-division courses in Spanish or Linguistics.

Linguistics minor. 12 credits selected from the following courses: Ling 3400, 4190, 4400, 4900; Engl 3020, 4200, 4230, 5210.

For additional information on language major and minor programs offered by the Department of Languages and Philosophy, contact the department office.

Proficiency Tests and Placement in Language Courses. Students who have completed one or more years of language study in high school may take proficiency tests to determine their proper placement in language courses offered by the department.

Credit by Special Examination. Where basic skills in a department-taught language other than Spanish have been acquired by means other than college courses, up to 16 lower-division credits with a letter grade may be earned by completing a course in that language at a higher level than the credits to be acquired. This course needs to be completed with a grade of *B* or better. In Spanish, these credits must be obtained by taking a placement test. To receive all 16 credits, students must pass the test with a score of 500 or better.

Where basic skills in a language not offered by the department have been acquired by means other than college courses, up to 16 lower-division credits may be earned by special examination. All credit received by special examination is listed on transcripts as *P* (pass) grade. For further information, contact the department.

Technology Assisted Language Center. The department operates a technology assisted language center, located in Main 002, for instructional use associated with language classes, and for students desiring additional language practice outside of the classroom, including practice related to self-study courses. The center includes computer workstations capable of running multimedia applications, televisions, VCR players, and audio equipment.

Study-abroad Programs. The department offers summer study programs in Spain, Germany, and France. Students must be in good standing at the University and must have some language background to participate in these programs. In addition, the department also conducts an annual two- to three-week travel-study tour to Russia, including visits to Moscow and St. Petersburg. Students can receive credit for participating in these programs. For more information, contact the department.

Chinese Courses (Chin)

1010. Chinese First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. (4F)

1020. Chinese First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: Chin 1010 or equivalent. (4Sp)

2010. Chinese Second Year I. Second-year overview of speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: Chin 1020 or equivalent. (4F)

2020. Chinese Second Year II. Second-year overview of speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: Chin 2010 or equivalent. (4Sp)

3510. Chinese Business Language. Designed to develop students' business Chinese language skills in speaking, listening, reading, and writing, as well as cultural competence. Classwork focuses on Chinese business terms, business conversation, and basic business practices, as well as the Chinese cultural environment. Prerequisite: Chin 2020 or equivalent. (3F)

French Courses (Fren)

Lower Division

1010. French First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school French or equivalent. (4F,Sp)

1020. French First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Fren 1010 or equivalent. (4F,Sp)

1800. French I Study Abroad. Offered only through USU's study program in France. Emphasizes reading and discussion of readings in French. (1-4Su) ®

2010. French Second Year I. Continued development of communicative competencies in the four language skills, with more emphasis on communication through reading and writing and continued exposure to cultures and customs. Prerequisite: Fren 1020 or equivalent. (4F,Sp)

2020. French Second Year II. Continued development of communicative competencies in the four language skills, with more emphasis on communication through reading and writing and continued exposure to cultures and customs. Prerequisite: Fren 1020 or equivalent. (4F,Sp)

2800. French II Study Abroad. Offered only through USU's study program in France. Emphasizes reading and discussion of readings in French. Prerequisite: Fren 1020 or equivalent. (1-4Su) ®

2810. French II Readings Abroad. Offered only through USU's study program in France. Emphasizes reading and discussion of readings in French. Prerequisite: Fren 1020 or equivalent. (1-4Su) ®

2880. Individual Readings. Individual study of selected readings in French. Instructor's permission required. (1-4F,Sp) ®

Upper Division

Upper-division French courses (3000 level and above) are available *only* to students who have completed Fren 2020 or who can demonstrate equivalent proficiency through testing.

3040. French Grammar. Thorough review of French grammar from the simpler to the more complex forms. Designed for students who have not had extended residence in a francophone country or extended exposure to a francophone environment. (3F)

CI 3050. French Composition. Presents a process approach to writing portraits, descriptions, essays, stories, critical reviews, and creative pieces. Designed for students who have not had extended residence in a francophone country or extended exposure to a francophone environment. (3Sp)

CI 3060. French Conversation. Designed to develop effective communication skills, to increase vocabulary, and to teach students to express and justify facts, opinions, ideas, and emotions in French. Not open to students with foreign experience. Designed for students who have not had extended residence in a francophone country or extended exposure to a francophone environment. (3F)

***CI 3510. Business French.** Study of vocabulary, idioms, and expressions used in French business communications and an introduction to French business practices. (3F)

****3550. French Civilization.** Study of historical, social, political, economic, and cultural conditions and institutions of France from early to modern times. (3F)

3570. France Today. Study of contemporary life in France, the French people, their daily habits, and their surroundings. What makes the French French. Extensive use of videos, films, and slides. No prerequisites; taught in English. (3Sp)

***3600. Introduction to French Literature.** Analytical study of major genres represented in French literature: poetry, prose, drama. Selections studied are chosen from the major periods of French literature. (3F)

3800. French III Study Abroad. Designed to be offered only through USU's study program in France. Covers French grammar, contemporary language (standard, slang, and business), phonetics, and conversation. (1-4Su) ®

3810. Topics in French Culture or Literature—Study Abroad. Designed to be offered only through USU's study program in France. Covers literature on the third-year level, or aspects of French culture, including art history. (1-4Su) ®

****3900. Special Topics—French.** Introduction to upper-division topics in contemporary literature, culture, and language as determined by student need. Occasionally taught in English. Open to majors and nonmajors. (3F)

4040. Advanced French Grammar. Review of grammar for students who have had extended residence in a francophone country. (3F)

CI 4050. Advanced French Compostion. Presents process approach to advanced writing, including critical reviews of films, summaries, biographical and descriptive texts, short research papers, and "explication de texte." Designed for students who have had extended residence in a francophone country. (3Sp)

CI 4060. Advanced French Conversation. Designed for students who have already reached advanced proficiency in speaking through foreign experience, but need to continue the development of their conversational skills. (3Sp)

***4200. Applied Linguistics and Phonetics of French.** First part analyzes phonological and phonetic patterns of French. Second part deals with selected morphological and syntactic features of French. (3Sp)

4520. Information Technologies in French. Practices, theoretical issues, and policy concerns of information technologies resulting from microcomputers, networking, and videodisk. Use of microcomputer with French programs. Taught in French. (3F)

***DHA 4610. Survey of French Literature: Part I.** Overview of French literature in the twentieth century. All genres are studied and differences between them are examined thoroughly. (3Sp)

****DHA 4620. Survey of French Literature: Part II.** Overview of French literary movements and transitions from the Middle Ages to 1800. All genres are studied and differences between them are examined thoroughly. (3F)

****DHA 4630. Survey of French Literature: Part III.** Overview of French literature in the nineteenth century. All genres are studied and differences between them are examined thoroughly. (3Sp)

4800. Seminar in French Language—Study Abroad. Designed to be offered only through USU's study program in France. Covers advanced grammar, translation, and special projects relating to French language on the fourth-year level. (1-4Su) ®

4810. Contemporary France—Study Abroad. Designed to be offered only through USU's study program in France. Covers contemporary France, its social, economic, and political history. (1-4Su) ®

4820. Seminar in French Literature—Study Abroad. Designed to be offered only through USU's study program in France. Covers modern French literature on an advanced level. (1-4Su) ®

4880. Individual Readings. Readings in scientific, technical, or literary French. Prerequisite: Permission of instructor. (1-4F,Sp) ®

****4900. Seminar in French Literature.** Content determined by student need and interest. Used at least once a year for literature in translation. (3F)

German Courses (Germ)

Lower Division

1010. German First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school German or equivalent. (4F,Sp)

1020. German First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Germ 1010 or at least one, but not more than two, years of German in high school. (4F,Sp)

1800. German I Study Abroad. Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the first-year level. (1-4Su) ®

2010. German Second Year I. Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of cross-cultural analysis. Prerequisite: Germ 1020 or equivalent. (4F,Sp)

2020. German Second Year II. Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of cross-cultural analysis. Prerequisite: Germ 2010 or equivalent. (4F,Sp)

****2550. German Civilization.** Covers the most important developments in German-speaking countries from the High Middle Ages to the present. Deals with political, social, literary, historical, and artistic expressions of an emerging culture. (3F)

****2570. Contemporary Germany.** Covers the most important elements of contemporary German culture in its literary, social, and artistic manifestations, and the political and historical dimensions of agents of change. (3Sp)

2800. German II Study Abroad. Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the second-year level. No prerequisites. (1-4Su) ®

2880. Individual Readings. Individual study of selected readings in German. Prerequisite: Instructor's permission. (1-4F,Sp) ®

Upper Division

Upper-division German courses (3000 level and above) are available *only* to students who have completed Germ 2020 or who can demonstrate equivalent proficiency through testing.

DHA 3000. Introduction to German Studies. Introduction to the discipline of German Studies (history, literature, the arts, philosophy, science, economics, politics, etc.), addressing information resources, research methods, student career goals, and practice. Advances oral and written language proficiency. (3F)

CI 3040, CI 3050. Advanced German Grammar and Composition. Thorough review of German grammar and style. Application of rules of writing to compositions. Oral presentations of contemporary topics with graded difficulty. Taught in German. (3F) (3Sp)

DHA 3300. Contemporary German Speaking Cultures. Multidisciplinary examination of current trends in contemporary cultures. Written, oral, visual, and electronic texts from the post-World War II period will be analyzed and placed in sociopolitical, economic, historical, and literary contexts. Emphasis on Germany as a multicultural society, and on related popular and minority cultural discourse. Interactive format. (3F,Sp)

***CI 3510. Business German.** Study of current German business and commercial practices, terminology, and business-related communications skills in a multi-disciplinary and global world context. Advances the four language skills. (3Sp)

***CI 3540. Techniques in Translating German Texts.** Approaches to translation. Specialized vocabulary, reference materials, and aids. Translation theory. Practical exercises. (3Sp)

****DHA 3550. Cultural History of German Speaking Peoples.** Overview and critical analysis of cultural, historical, and intellectual developments that have shaped the civilizations of German-speaking peoples from 800 A.D. until the end of World War II. Examination of written, oral, visual, and electronic texts integrated in the context of Western philosophy and humanist thought. Interactive format. (3F,Sp)

****DHA 3600. Survey of German Literature I.** Overview, with selected readings, of the major literary trends in German-speaking cultures from the medieval period to the early nineteenth century, including the study of genres, epochs, styles, and theories in the context of evolving cultures. (3F)

****DHA 3610. Survey of German Literature II.** Overview, with selected readings, of the major literary trends in German-speaking cultures from the early nineteenth century to the present, including the study of genres, epochs, styles, and theories in the context of evolving cultures. (3Sp)

3800. German III Study Abroad. Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the third-year level. (1-4Su) ®

3880. Individual Readings. Individual study of selected readings in German. Prerequisite: Instructor's permission. (1-4F,Sp) ®

****4200. Applied Linguistics and Phonetics of German.** Discussion of syntactical and morphological problems of German, principles of language learning, and analysis of phonological and phonetic patterns. (3F)

****4600. Faust's Legacy.** Examination of the legendary figure of Faust through historical and contemporary perspectives. Analysis of the Faust theme and character as presented in literature, films, stage productions, and musicals. Taught in English. (3Sp)

****4610. German Narratives.** Readings from a wide range of narrative texts representing various historical periods. Focus on literary traditions within historical contexts. Examination of styles, motifs, and the theory of the novel. (3Sp)

***4650. Trends in Modern German Literature.** Study of literary movements, topics, and styles of modern (twentieth century) German literature. Concentration on texts representing a variety of aesthetic expressions, central to experiences of twentieth century life. (3F,Sp)

4800. German IV Study Abroad. Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the fourth-year level. (1-4Su) ®

4880. Individual Readings. Readings in technical, scientific, and literary German. Prerequisite: Instructor's permission. (1-4F,Sp) ®

***4900. Special Topics.** Selected critical topics and themes relating to German literature, culture, film, pedagogy, linguistics, and associated theories. Includes readings in English and German. Content determined by student need and interest. (3Sp) ®

****4910. German for Special Purposes.** Advances German communicative proficiency in the fields of business, science, and pedagogy. Promotes professional applications of German terminologies and procedures for science and commerce, as well as teaching methodology. Discipline-interactive projects advance the four language skills. (3Sp)

Greek Courses (Grk)

Greek courses are listed with the History Department (see page 240).

Italian Courses (Ital)

1010. Italian First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. (4F)

1020. Italian First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: Ital 1010 or equivalent. (4Sp)

2010. Italian Second Year I. Second-year overview of speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: Ital 1020 or equivalent. (4F)

2020. Italian Second Year II. Second-year overview of speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: Ital 2010 or equivalent. (4Sp)

Japanese Courses (Japn)

1010. Japanese First Year I. First course in beginning Japanese. Proficiency in the recognition of the basic Japanese sound system by learning Hiragana and Katakana. Communicative mastery of sentences having polite and plain forms of verbs, adjectives, and copula. Exposure to Japanese culture and customs. (4F)

1020. Japanese First Year II. Second course in beginning Japanese. Introduction to the basic 100 Kanji. Mastery of more complicated sentences, including conditional temporal, volitional, and potential expressions. Exposure to Japanese culture and customs. Prerequisite: Japn 1010 or equivalent. (4Sp)

2010. Japanese Second Year I. First course in intermediate Japanese. Proficiency in reading and writing 150 additional Kanji. Mastery of the last basic grammar topics, such as passive, causative, passive causative, and giving/receiving expressions. Introduction to honorific/humble expression. Exposure to Japanese culture and customs. Prerequisite: Japn 1020 or equivalent. (4F)

2020. Japanese Second Year II. Second course in intermediate Japanese. Proficiency in reading 150 additional Kanji and writing 200 additional Kanji. Mastery of frequently used idioms and expressions. Exposure to more authentic reading materials. Competency in writing short essays. Exposure to Japanese culture and customs. Prerequisite: Japn 2010 or equivalent. (4Sp)

3010. Japanese Third Year I. First segment of the third-year Japanese reading/writing course. Proficiency in reading and writing an additional 500 Kanji. Prerequisite: Japn 2020 or equivalent. (4F)

3020. Japanese Third Year II. Second segment of the third-year Japanese reading/writing course. Proficiency in reading and writing an additional 500 Kanji. Prerequisite: Japn 3010 or equivalent. (4Sp)

3510. Japanese for the Business Environment. Mastery of technical terms related to Japanese business and its environment. Communicative competency in contemporary Japanese society. Prerequisite: Japn 3020. (3Sp)

Korean Courses (Kor)

1010. Korean First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. (4F)

1020. Korean First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Kor 1010 or equivalent. (4sp)

2010. Korean Second Year I. Development of grammatical knowledge and writing skills. Prerequisite: Kor 1020 or equivalent. (4F)

2020. Korean Second Year II. Development of advanced reading comprehension skill through discussions and summaries of a variety of texts. Prerequisite: Kor 2010 or equivalent. (4Sp)

3010. Korean Third Year I. Development of advanced reading, writing, and conversational skills. Prerequisite: Kor 2020 or equivalent. (4F)

3020. Korean Third Year II. Continuous development of advanced reading, writing, and conversational skills. Prerequisite: Kor 3010 or equivalent. (4Sp)

Language Courses (Lang)

3990. Special Topics. Additional readings or research done beyond the material covered in other language courses. May be repeated for credit if different topic is covered. Prerequisite: Instructor's permission. (1-5F,Sp,Su) ®

4200H. Senior Honors Seminar. Credit for completing and presenting a senior honors thesis project. Requirement may be fulfilled by publishing the thesis in an academic journal, defending the thesis before a faculty committee, presenting the thesis at an academic conference, or presenting the thesis in the languages session during Scholar's Day. (1Sp)

4210H. Senior Honors Thesis. Independent study research credits for preparation of a senior honors thesis to fulfill requirements for a degree in languages with departmental honors. Prerequisite: Permission of instructor prior to enrollment. (1-4F,Sp) ®

Latin Courses (Latn)

Latin courses are listed with the History Department (see page 240).

Linguistics Courses (Ling)

2250. Cooperative Education. Course credit for professional experience outside the classroom. Statement of professional goals and a summary report following the experience are required. (1-3F,Sp,Su) ®

3000. Career Orientation for Foreign Language Majors and Minors. Exploration of possible career paths requiring foreign language proficiency. Examination of careers in teaching, translating and interpreting, government, business, industry, and others using language as an auxiliary skill. Taught on demand only. (1F)

3300. Clincial Experience I. First clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level I. Taken concurrently with Ling 4400. Prerequisites set by Secondary Education Department. (1F,Sp)

3400. The Study of Language. Investigates ways in which human languages are structured, how they change, how they reflect the cultures in which they are used, and how they are learned. (3F,Sp)

4190. Language Laboratory Methodology and Techniques in Foreign Language Instruction. Practical instruction and demonstration of a modern foreign language laboratory operation, including the use of audio, video, and computer equipment to teach the four basic skills: listening, speaking, reading, and writing. Prerequisite: 15 credits in upper-division language courses. (2Sp)

4250. Cooperative Education. Course credit for professional experience outside the classroom. Statement of professional goals and a summary report following the experience are required. (1-3F,Sp,Su) ®

4300. Clincial Experience II. Second clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level II. Taken concurrently with Ling 4400. Prerequisites set by Secondary Education Department. (1F,Sp)

4400. Teaching Modern Languages. Methods course for teaching majors or minors in any of the modern languages. Considers the context of the present secondary language classroom, effective teaching techniques that can be used in that context, and significant trends in teaching and learning languages. (3F,Sp)

4900. Analysis of Cross-Cultural Difference. Develops awareness of what culture is and how it shapes perceptions and attitudes. Through interactive student-centered activities, students learn to analyze cultural differences. (3Sp)

4920. Senior Practicum in Language Teaching. (1-4F,Sp,Su) ®

5500. Student Teaching Seminar. Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, with emphasis on reflective teaching. (2F,Sp)

5600. Student Teaching in Secondary Schools. Ten-week culminating practicum experience in which students assume full-time teaching responsibilities under direction of cooperating teachers in their major and minor fields. Prerequisites set by Secondary Education Department. (8F,Sp)

6510. Syntactic Analysis. Analysis of syntactic patterns across languages. Language typology and contrastive analysis. (3F)

6800. Topics in Second Language Acquisition. Advanced seminar in the acquisition and teaching of languages. (3F,Sp,Su) ®

Portuguese Courses (Port)

1010. Portuguese First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Self-study with tutorial assistance. (4F)

1020. Portuguese First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Self-study with tutorial assistance. Prerequisite: Port 1010 or equivalent. (4F,Sp)

1050. Intensive Portuguese for Spanish Speakers. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Intensive course for Spanish speakers. (4Sp)

2010. Portuguese Second Year I. Further development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Self-study with tutorial assistance. Prerequisite: Port 1020 or 1050 or equivalent. (4F)

2020. Portuguese Second Year II. Further development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Self-study with tutorial assistance. Prerequisite: Port 2010 or equivalent. (4Sp)

2880. Individual Readings. Individual study of selected readings in Portuguese. Instructor's permission required. (1-4F,Sp) ®

CI 3040. Advanced Portuguese Grammar and Composition. Review of the more complex Portuguese grammatical points and development of writing skills through composition. Prerequisite: Port 2020 or equivalent. (3F,Sp)

4880. Individual Readings. Readings in Brazilian and/or Portuguese literature. Prerequisite: Instructor's permission. (1-4F,Sp) ®

Russian Courses (Russ)

1010. Russian First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school Russian or equivalent. (4F)

1020. Russian First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Russ 1010, or not more than three years of high school Russian. (4Sp)

2010. Russian Second Year I. Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of culture. Prerequisite: Russ 1020 or two or more years of high school Russian. (4F)

2020. Russian Second Year II. Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of culture. Prerequisite: Russ 2010 or three or more years of high school Russian. (4Sp)

2880. Individual Readings. Individual study of selected readings in Russian. Prerequisite: Instructor's permission. (1-4F,Sp) ®

3040, 3050. Advanced Russian Grammar and Composition. Detailed presentation of Russian grammar. Class discussions and work on oral and written assignments. Prerequisite: Russ 2020 or equivalent. (3F) (3Sp)

3300. Contemporary Russian Language and Culture. Reading and discussion of contemporary popular, literary, and scientific materials in Russian. Also cultural and historical considerations of today's Russia. Prerequisite: Russ 2020 or equivalent. (3F)

3540. Russian Translation for Science, Business, and Culture. Familiarization with approaches to translation, special grammatical structures, specialized vocabulary, and reference materials and aids. Practical exercises. Prerequisite: Russ 2020 or equivalent. (3Sp)

4880. Individual Readings. Readings in technical, scientific, or literary Russian. Prerequisite: Instructor's permission. (1-4F,Sp) ®

Spanish Courses (Span)

Lower Division

1010. Spanish First Year I. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to students having more than one year of Spanish in high school or equivalent. (4F,Sp)

1020. Spanish First Year II. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Span 1010 or equivalent. (4F,Sp)

1050. Intensive First Year Spanish. Intensive one-semester alternative course to Span 1010 and 1020, emphasizing active usage. (8Su)

1800. Spanish I Study Abroad. Taught overseas only. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. (1-4Su) ®

2010. Spanish Second Year I. Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Span 1020 or equivalent. (4F,Sp)

2020. Spanish Second Year II. Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Span 2010 or equivalent. (4F,Sp)

2800. Spanish II Study Abroad. Taught overseas only. Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: Span 1020 or equivalent. (1-4Su) ®

Upper Division

Upper-division Spanish courses (3000 level and above) are available *only* to students who have completed Span 2020 or who can demonstrate equivalent proficiency through testing.

CI 3040. Advanced Spanish Grammar. Intense review of selected problematic areas of Spanish grammar for students with advanced language skills. (3F,Sp)

CI 3050. Introduction to Literature and Composition. Introduction to different genres, literary analysis, and composition through reading selections from Peninsular and Latin American literature. Required for Spanish majors. Prerequisite: Span 2020 or equivalent. (3F,Sp)

CI 3060. Advanced Spanish Conversation and Composition. Development of advanced conversation and writing skills through debate and composition on contemporary controversial topics. (3F)

3510. Business Spanish. Development of communication skills in Spanish for international Hispanic business purposes. (3F)

DHA 3550. Spanish Culture and Civilization. Historical, social, political, economic, and cultural conditions and institutions of Spain. (3F)

DHA 3570. Latin American Culture and Civilization. Historical, social, political, economic, and cultural conditions and institutions of Latin American countries. (3Sp)

DHA 3600. Survey of Spanish Literature I. Selective readings and discussion of major works and authors in Spanish literature from El Cid through Calderon. (3F)

DHA 3610. Survey of Spanish Literature II. Selective readings and discussion of major works and authors in Spanish literature from the eighteenth to twentieth centuries. (3Sp)

DHA 3620. Survey of Latin American Literature I. Developments and trends in Latin American literature from the sixteenth century to the Modernist Movement. (3F)

DHA 3630. Survey of Latin American Literature II. Developments and trends in Latin American literature from the Modernist Movement to the present. (3Sp)

3800. Spanish III Study Abroad. Intense review of selected problematic areas of Spanish grammar for students with advanced language skills. Taught only in studies overseas in Spanish program. (1-4Su) ®

4200. Applied Spanish Linguistics and Phonetics. Analysis of selected phonological, morphological, syntactic, and semantic features of the Spanish language, including Spanish-English contrastive analysis. (3Sp)

4800. Hispanic Culture and Civilization—Study Abroad. Historical, social, political, economic, and cultural conditions and institutions of Hispanic countries. Taught only in studies overseas in Spanish program. (1-4F,Sp,Su) ®

4880. Individual Readings. Individual readings or projects in Spanish. Prerequisite: Instructor's permission. (1-4F,Sp) ®

4900. Topics of Spanish Literature. Variable topics. Course may be repeated with permission of instructor. (3F,Sp) ®

4910. Topics of Latin American Literature. Variable topics. Course may be repeated with permission of instructor. (3F,Sp) ®

Philosophy

Philosophy at USU reflects the ideals of the liberal arts in encouraging the respect for truth without promoting dogmatism, and in offering the opportunity for students to increase their self-understanding at the same time as they increase their knowledge of the world around them.

Philosophy faculty in the Department of Languages and Philosophy teach courses leading to an undergraduate major and a minor in philosophy. The mission of the Philosophy program at Utah State University is to provide a high-quality education leading to an understanding of the major areas of inquiry represented within the discipline of philosophy. Coursework emphasizes the areas of the history of philosophy, logic, ethical theory and applied ethics, and metaphysics and epistemology. The curriculum is designed to meet a wide variety of student interests in pursuing a major in philosophy. It provides a rigorous foundation for students intending to further their education in law school or graduate school in philosophy, and it also provides an exciting and challenging education for those students who enjoy thinking about ideas for their own sake. Coursework is also designed to enrich the education of students majoring in other subjects, by providing them with opportunities to gain an understanding of philosophical perspectives on and philosophical foundations of their chosen fields.

Course Requirements

Bachelor of Arts in Philosophy (30 credits). Phil 1200 or 2200, 2400 or 2500, 3100, 3120; one of the following courses: Phil 3500, 3510, 3520, 3540, 4500, or 4610; two of the following courses, at least one of which must be Phil 4300 or 4400: Phil 4300, 4310, 4400, 4410, 4420; three other upper-division philosophy courses; other University Studies courses as required by the University; completion of the foreign language requirement for the BA degree (see page 48).

The **Bachelor of Science** degree can be awarded in Philosophy to philosophy majors who have not completed the foreign language requirement for the Bachelor of Arts degree in Philosophy.

Philosophy Minor (18 credits). Six courses in Philosophy, at least four of which must be at the upper-division level, must be completed for a philosophy minor.

Philosophy Courses (Phil)

BHU 1010. Introduction to Philosophy. Introduction to philosophical questions regarding truth, knowledge, reality, mind, God, morality, and meaning. Examination of various philosophical responses to these questions. (3F,Sp)

***BHU 1200. Practical Logic.** Recognition of arguments and their logical structure. Study of formal and informal fallacies in reasoning. Enthymemes, analogical arguments, syllogisms, and Venn diagrams. Logical analysis of writing in the arts and sciences. (3Sp)

QI 2200. Deductive Logic. Study of deductive arguments and techniques for evaluating their validity. Recognizing formal fallacies in reasoning. Symbolizing English sentences and arguments to make their meanings precise. Study of quantifiers and relations. Prerequisite: Math 1030 or Stat 1040. (3F,Sp)

****2210. Inductive Logic.** Study of inductive arguments and techniques for evaluating their strength. Discussion of philosophical problems of induction and probability. Application of probability theory in opinion polls and in the testing of generalizations and casual claims. (3Sp)

BHU 2400. Ethics. Study of judgments concerning what is good or bad, right or wrong. How judgments are justified and related to action. Relativism, subjectivism, absolutism, freedom, and responsibility. (3Sp)

BHU 2500. Social Ethics. Examination of principles and arguments underlying current debate in American law and politics. Topics may include abortion, euthanasia, capital punishment, discrimination and affirmative action, sexual harassment, freedom of expression, welfare, and duties to help the poor in other nations. (3F)

***CI 3100. Ancient Philosophy.** Development of philosophical thought in the Ancient Greek world. Readings from the pre-Socratics, Plato, Aristotle, the Stoics, and Epicureans. (3F)

****3110. Medieval Philosophy.** Neo-Platonism with stress on Plotinus, St. Augustine, and early Christian philosophy; early medieval thought; St. Thomas Aquinas and the rise of scholasticism; and philosophical thought in the Renaissance. (3Sp)

***CI 3120. Early Modern Philosophy.** Philosophers and philosophical disputes in Western Europe from 1400-1750. Figures and topics may include: Bacon, Hobbes, Descartes, Locke, Hume, nominalism, empiricism, rationalism, religion, politics, and morals. (3F)

***CI 3150. Kant and His Successors.** Philosophers and philosophical disputes in Western Europe from 1750-1900. Study of Kant, Hegel, Bentham, Mill, Marx, Schopenhauer, and Nietzsche. Examination of critcal idealism, philosophy of history, utilitarianism, communism, and origins of existentialism. (3Sp)

****CI 3160. Contemporary Philosophy.** Twentieth century philosophical thought, including existentialism, logical positivism, analytic philosophy, and postmodernism, as expressed in the works of Heidegger, Husserl, Wittgenstein, Carnap, Russell, Quine, Sartre, Derrida, and others. (3F)

***DHA, CI 3180. Contemporary European Philosophy.** Study of twentieth-century philosophical movements originating and developing on the European continent. Movements to be considered may include: existentialism, phenomenology, hermeneutics, and post-metaphysical philosophy. (3F)

***3300. Mind Sets.** Examination of different ways of looking at the nature of reality and human existence. Readings from authors such as: Plato, Augustine, St. Bonaventure, Darwin, Marx, Chardin, and Heidegger. (3F)

3500. Medical Ethics. Key issues in medicine, including: consent, competency, confidentiality, euthanasia, abortion, and the justification of health care. (3F)

3510. Environmental Ethics. Key issues in the treatment of nature, such as: the value of wilderness, animal rights, comparative views of nature, and moral issues in economic approaches to the wilderness. Taught Spring 1999 and Fall 2000. (3F,Sp)

DHA 3520. Business Ethics. Key issues in business, including: foreign bribery, corporate responsibility, corporate culture, ethical theories, justice, and preferential treatment. (3Sp)

***DHA 3530. Ethics and Biotechnology.** Interdisciplinary examination of key issues such as: cloning, human genetic screening and therapy, and transgenic animals and food. (3Sp)

***DHA 3540. Human Values and Technology.** Philosophical investigation of relations between technological change, human values, and the good life. Emphasis on growth of computer-mediated communication and its impact on values such as autonomy and privacy. (3Sp)

3700. Philosophy of Religion. Problems in defining "religion" and the existence of God; the problem of evil; the immortality of the soul; religious experience; faith; alternatives to theism; religious language. (3F)

***3710. Philosophies of East Asia.** Study of three Asian philosophies: Confucianism, Taoism, and Buddhism. Focus on appreciating the merits of each system of thought. Emphasis on class discussion and participation. (3F)

***3720. Philosophical Theology After Kant.** Explores attempts to reconstruct the reasonable basis of religion in the two centuries after the Enlightenment. (3Sp)

***CI 3730. Philosophy of the New Testament.** Historical and intellectual context of the development of the New Testament. Character, ideas, and historical setting of the various documents. (3Sp)

****DHA 3800. Philosophy in Literature.** A study of philosophical problems and issues dramatized in works of literature and cinema, including: Joseph Heller's "Catch-22," Robert Heinlein's "Stranger in a Strange Land," Daniel Galouye's "Dark Universe," Michelangelo Antonioni's "Blow Up," Bernt Capra's "Mindwalk," and Ingmar Bergmann's "The Seventh Seal." (3F)

DHA 3810. Aesthetics. Analysis of traditional theories of aesthetics and art criticism. Theories are applied to illustrative examples, including music, painting, photography, sculpture, dance, literature and cinema. (3Sp)

***DHA 4300. Epistemology.** Study of foundations of knowledge and belief systems, and related topics in epistemology, including perception, certainty, and skepticism. (3F)

DHA 4310. Philosophy of Science. Study of different views of the nature of science: the classical traditions of Hempel and Popper, Kuhn's subjectivism, and Feyerabend's anarchism. Topics include confirmation, induction, scientific realism, reductionism, and the growth of scientific knowledge. (3Sp)

****DHA 4320. History of Scientific Thought.** Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and how this knowledge may be acquired. (3Sp)

****4400. Metaphysics.** Study of fundamental problems of existence. Topics include: mind and its relation to the body, determinism and human freedom, fatalism, idealism and realism, truth, and our knowledge of the world. (3F)

DHA 4410. Philosophy of Mind. Beginning with the context of Cartesian mind/body dualism, a thorough examination of Cartesian privacy, privileged access, and the problem of other minds is conducted. Ancillary topics may include the mind/machine controversy and animal intelligence. (3F)

****4420. Philosophy of Language.** Nature and uses of language, concepts of meaning, reference, truth, syntax, semantics, pragmatics, metaphors, ambiguity, vagueness, and definition. Application in linguistics, psychology, anthropology, and literary criticism. (3Sp)

***4500. Contemporary Ethical Theory.** Careful examination of one or more topics playing a central role in current moral philosophy. Focus on work produced in philosophical literature within last twenty years. (3Sp)

***4600. Philosophy of Law.** Examines the nature of law, relations between law and morality, the obligation to obey law, ways to interpret law, the justification of legal punishment, and appropriate conditions for civil and criminal liability. (3F)

****DHA 4610. Social and Political Philosophy.** Explores the nature of a just society, political obligation, and justification and proper limits of political power. (3Sp)

4900. Special Topics. Detailed consideration of a particular philosopher or philosophical problem. Instructor approval required. Course may be repeated when a different topic is discussed. (3F,Sp) ®

4910. Readings and Research. Independent study of a particular philosopher or philosophical topic. Consent of instructor required. Course may be repeated when a different topic is discussed. (1-4F,Sp) ®

4920H. Senior Honors Seminar. Credit for completing and presenting a senior honors thesis project. Requirement may be fulfilled by publishing the thesis in an academic journal, defending the thesis before a faculty committee, presenting the thesis at an academic conference, or presenting the thesis in the philosophy session during Scholar's Day. (1Sp)

4930H. Senior Honors Thesis. Independent study research credits for preparation of a senior honors thesis to fulfill requirements for a degree in philosophy with departmental honors. Prerequisite: Permission of instructor prior to enrollment. (1-4F,Sp,Su) ®

****6420. Philosophy of Language.** (3Sp)

6890. Philosophy of Science. (3Sp)

6900. Independent Study. (1-4F,Sp,Su) ®

Speech Communication

Speech Communication has been taught continuously at USU almost from the University's founding in 1888. Speech Communication faculty in the Department of Languages and Philosophy teach courses leading to minors in Organizational Communication and Speech Communication Teaching. The minor program in **Organizational Communication** is designed for students who seek communication and human relations competencies, an understanding of human communication behavior, and the critical thinking skills required for success in a variety of careers. The course of study leading to a minor in **Speech Communication Teaching** is designed to develop the communication competencies and the understanding of communication processes and theory necessary for effective high school speech communication instruction. Prior to student teaching, the program features practicum experience in which students learn how to critique and coach speech communication students.

Course Requirements

Organizational Communication Minor (15 credits). Spch 1050 or 2600, 2100, and 9 other credits in Speech Communication courses, selected in consultation with a program adviser. At least 3 of these 9 credits must be from a class offered at the 4000 or 5000 level.

Speech Communication Teaching Minor (19 credits). Spch 1050, 2100, 2600, 3000, 4280, 5280, and either Spch 3330 or 5090.

Speech Communication Courses (Spch)

CI 1050. Public Speaking. Speaking in formal public communication situations. Development of skills in speech preparation, audience adaptation, and delivery. (3F,Sp)

***CI 2100. Theories of Speech Communication.** Social, scientific, and humanistic inquiry into the process of human communication. Multi-theoretical approach, including perspectives of interpersonal, persuasive, organizational, intrapersonal, and intercultural communication. (3F)

****2280. Listening.** Development of comprehension, critical, and relationship listening skills. Experience in developing listening training for kindergarten to adult education. (2Sp)

CI 2600. Interpersonal Communication. Examination of theories, methods, and competencies relevant to studying, establishing, and maintaining interpersonal relationships in family, intercultural, professional, and other contexts. Classroom experiences with topics such as perception, language, nonverbal behavior, conflict resolution, and listening. (3F,Sp)

3000. Speech Communication Teaching Practicum. Intensive speech teaching workshop. Supervised on-campus teaching experience. Must be completed prior to student teaching experience. Repeatable to a maximum of 2 credits. (1Sp) ®

DSS 3050. Technical and Professional Communication. Skill development in oral technical reporting, interviewing, and interpersonal communication to meet the unique communication requirements of business, industry, and the professions. (3Sp)

***3250. Organizational Communication.** Study of internal communication requirements of organizations. Analysis of communication problems associated with conflict, diversity, interpersonal influence, communication technology, and information flow. Development of effective communication practices. (3F)

DSS 3330. Intercultural Communication. Study of how communication shapes culture and how culture, in turn, affects communication. Development of active intercultural communication in professional and personal contexts. (3Sp)

CI 3400. Interpersonal Influence. Survey of theory and research investigating social influence in face-to-face interactions. Topics include: compliance-gaining strategies, enactment and detection of deception, verbal and nonverbal influence, attitude change, communicator characteristics, credibility, and ethics. (3Sp)

***4280. Argumentation and Debate.** Techniques of analysis, investigation, evidence, reasoning, brief making, refutation, and construction and delivery of the argumentative speech and academic debate. (3F)

****CI 4800. Nonverbal Communication.** Examination of theories, methods, and competencies relevant to studying, enacting, and perceiving gestures, facial expressions, body movements, touches, and other nonverbal cues. Investigation of environmental, cultural, and social influences on nonverbal communication in a variety of contexts. (3F)

5000. Studies in Speech Communication. Study of special topics in interpersonal, small group, organizational, or intercultural communication theory and research. Prerequisite: Permission of instructor. (1-5F,Sp) ®

****5090. Small Group Theory.** Study of theories of group processes such as decision-making, leadership, power, conflict, deviance, and the development of group structures, functions, norms, and roles. (3Sp)

****5280. Communication Education Theory.** Study of contemporary theories and research in communication education. Emphasis on communication competency development, communication apprehension, critical thinking, communication assessment, development of communication ethics, freedom of speech, instructional communication, and history of communication education. (3F)

5370. Methods in Teaching Theatre and Speech. Development of materials and strategies for teaching secondary school speech and theatre. Team taught by Speech and Theatre Arts faculties. Prerequisite: Admission to teacher education. (3F)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Graduate Program

Master of Second Language Teaching (MSLT)

The department offers advanced study leading to a Master of Second Language Teaching (MSLT) degree. The MSLT degree program is designed for students desiring additional training at the graduate level in an integrative, interdisciplinary program combining coursework in the fields of foreign language education, bilingual education, and ESL/EFL education. For program information, including admission requirements, degree requirements, courses, and financial assistance, contact the departmental office or see the program's website at **http://www.usu.edu/~langphil/mslt.html**.

Liberal Arts and Sciences Program

Director: *Ann Leffler*
Office in Main 338E, (435) 797-1195

Adviser, Science/HASS Advising Center
Office in Student Center 304, (435) 797-3883

The Liberal Arts and Sciences Program (LASP) offers a broad and challenging course of study in the humanities, sciences, arts, and social sciences. Through a multi-disciplinary but coherent approach to learning, the program meets the needs of students majoring in professional fields, as well as those desiring a general background for adaptability and mobility in employment.

The Liberal Arts and Sciences Program at Utah State University has been cited by the American Association for the Advancement of Science as one of four national model major programs integrating the sciences and liberal arts, and it has received an award from the National Endowment for the Humanities. Corporate executives, community leaders, and national educators increasingly recognize that a broad background in liberal arts and sciences is the best possible training for productivity in our present-day society, where one-fourth of today's jobs did not exist 15 years ago. LASP offers USU students the training required to be competitive and to contribute effectively in the organizations, professions, and communities of the twenty-first century.

The hallmark of the Liberal Arts and Sciences program is the thematic cluster, whereby sets of courses are clustered around common themes to encourage interdisciplinary learning and curricular coherence. This cluster organization encourages students to combine insights across the sciences and liberal arts and to regard education as a tool for addressing central issues rather than as a disparate array of unrelated courses. Each thematic cluster concludes with a capstone course experience which brings students together who share common learning experiences. Every cluster and cluster course helps students achieve the LASP objectives listed below.

Objectives

While promoting interdisciplinary learning, LASP encourages students to develop the following:

1. **Abilities for critical thinking and communication.** Thinking critically and communicating clearly form the basis of most intellectual skills. Faced with intricate problem-solving situations, students must be able to communicate well in writing, graphics, and speech for various purposes and audiences.

2. **An understanding of numerical data.** The information age demands sophisticated quantitative, mathematical, statistical, and computational skills. Students must be able to use and interpret numerical data in multiple ways.

3. **An understanding of the methods and systems of natural science.** Students must learn to understand and use the methods of scientific investigation, to recognize the socio-political implications of scientific research, and to perceive the relationships between research and a burgeoning technology.

4. **Historical consciousness.** To formulate and implement constructive changes requires understanding historical forces and traditions. Students must learn how to assess historical evidence without oversimplifying its political or social bases.

5. **An understanding of social science.** By learning to approach the study of cultures, groups, and individuals analytically, students can prepare for rapidly changing institutions, such as the employment market, as well as a wide range of local, regional, and world problems.

6. **An awareness of ethics.** Students develop an appreciation of different value systems and application of ethical values in responsible decision making.

7. **A recognition of multi-cultural contexts.** Through international, inter-cultural, and language studies, students increase their understanding of and responsibility for the global community.

8. **An appreciation and experience of fine arts.** Students learn to experience and/or perform in the fine arts, thereby gaining access to realms of creativity, imagination, and feeling, ultimately enriching their own lives and the lives of those around them.

Curricula

Regardless of a student's major, there are a number of options for study within the Liberal Arts and Sciences Program. The Liberal Arts and Sciences Area Studies Certificate has been created to offer USU students a mechanism to enhance their University Studies (General Education) experience and discover more meaningful relationships among their courses. It combines “back to basics” rigor with an interdisciplinary emphasis on themes for the twenty-first century. In addition, LASP also offers a minor and major. The Liberal Arts and Sciences major consists of two separate tracks, each leading to a Bachelor of Arts degree. These various options and tracks are described below.

I. Liberal Arts and Sciences Program

(A) Liberal Arts and Sciences Area Studies Certificate. The certificate requires the LASP orientation course, LAS 2020 or 2120, as well as completion of two LAS clusters. The minimum number of credits required is 35. A minimum 2.5 GPA must be maintained in the certificate courses. At present, there are five clusters available: Beauty, Civilization, Science and Society, Future Environments, and Matter and Spirit. For current information on cluster status and requirements, consult the Science/HASS Advising Center (Student Center 304) or an LASP staff member. Upon graduation, students completing the Liberal Arts and Sciences certificate will receive notation of completion on their transcripts.

(B) Liberal Arts and Sciences Minor. While gaining a perspective on the liberal arts and sciences, students may want to explore more than two clusters. The minor supplements students' academic majors by widening employment options. It consists of LAS 2020 or 2120, three clusters, and at least 50 credits with a

minimum 2.3 GPA. For details, consult the Science/HASS Advising Center or an LASP staff member.

(C) Liberal Arts and Sciences Option: The Major. The LASP major allows students to explore and integrate the sciences and the liberal arts in depth. It requires LAS 2020 or 2120, completion of two clusters, and some combination of specific courses in the languages, mathematics, deductive logic, computer science, depth of knowledge credits, field or laboratory courses, self-expression courses, literature study, research methods, and a senior thesis. It also requires a 2.3 GPA overall for admission and graduation. Again, consult the Science/HASS Advising Center or a LASP staff member for details.

II. Liberal Arts Option

The Liberal Arts option is a separate track under the Liberal Arts and Sciences Major. This option allows the student to develop an individualized curriculum in consultation with the program adviser, Mary Leavitt (Student Center 304). This option also requires a 2.3 overall GPA for admission and graduation.

Although the emphasis of this option is in the humanities, arts, and social sciences, the student is encouraged to seek out other educational interests as part of an academic program. The following credit distribution will be typical of most students:

University Studies (30 credits)

Foreign Language (16 credits)

Liberal Arts Emphasis. The focus of study for the Liberal Arts option is to help students gain a basic understanding of the development of civilization, including historical and cultural traditions, political institutions and processes, an appreciation of arts and literature, and expanded capacities for critical thought. Four learning goals are identified, each requiring a minimum of 9 credits, for a total of 36 credits.

Students plan a multi-disciplinary academic program providing a focus for study, with emphasis in primarily social sciences, humanities, and arts.

Pre-professional and Elective Credits (38 credits)

Depending on a student's career objectives, a student may take courses leading to further study in medicine, law, business, or other graduate programs, or continue to study in a number of different disciplines.

Liberal Arts and Sciences Courses (LAS)

CI 2020. Pathways to Thinking. *Communications Intensive* version of the "Pathways" course. Like its cousin, LAS 2120, it offers students intellectual tools to enhance their involvement as informed citizens of the human community. Specifically, it offers ways to explore different fields by comparing their perspectives on special topics of the instructor's choice. This particular "Pathways" version asks students to think about different fields, partly through writing. Also emphasizes reading, discussing, and listening. Prerequisite: Engl 2010. (3F,Sp)

QI 2120. Pathways to Reasoning. *Quantitative Intensive* version of the "Pathways" course. Like its cousin, LAS 2020, it offers students intellectual tools to enhance their involvement as informed citizens of the human community. Specifically, it offers ways to explore different fields by comparing their perspectives on special topics of the instructor's choice. This particular "Pathways" version asks students to think about different fields, partly through numbers and data. Prerequisite: Math 1030 or Stat 1040. (3F,Sp)

4800. Senior Thesis Preparation. Open to Liberal Arts and Sciences majors only, this pass/fail course helps students begin their senior theses. Prerequisite: Junior standing. (1-3F,Sp,Su)

4900. Independent Study/Workshop. Independent, interdisciplinary study resulting in an original work. After obtaining permission from a Liberal Arts and Sciences adviser to take this course under the supervision of a particular instructor, the student must also obtain the instructor's permission. (1-3F,Sp,Su) ®

Department of
Management and Human Resources

College of Business

Head: Professor *Gary R. Oddou*, organizational behavior, international business and management
Office in Business 411, (435) 797-2787

Undergraduate Program Adviser: Principal Lecturer *Sharon Tarnutzer*, organizational behavior, management

Graduate Program Director: Associate Professor *Gaylen N. Chandler*, human resources, management, entrepreneurship
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Professors *Caryn L. Beck-Dudley*, business law, employment law, and social responsibility; *John R. Cragun*, organizational behavior and human resources; *Gary B. Hansen*, manpower economics, industrial relations; *Glenn M. McEvoy*, human resources, organizational

behavior, management; *David B. Stephens*, business strategy and labor relations; **Professors Emeritus** *Vernon M. Buehler, Howard M. Carlisle, Leon R. McCarrey, Y. Krishna Shetty;* **Associate Professors** *David A. Baucus*, business strategy, management, and entrepreneurship; *Melissa S. Baucus*, business strategy, management, social responsibility, and organizational behavior; *David R. Daines*, business law, employment law, and social responsibility; *Steven H. Hanks*, business strategy, management, and entrepreneurship; *Ross E. Robson*, management; **Assistant Professors** *Ronda R. Callister*, management, organizational behavior, international management; *Douglas W. Lyon*, management, business strategy; **Senior Lecturer** *Lawrence H. Siebers*, executive in residence, management, human resources, and social responsibility

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Management; BS and BA in Human Resource Management; department participates in the Master of Social Sciences (MSS) with a specialization in Human Resource Management

The department also participates in the College of Business Master of Business Administration (MBA) Degree. A description of the MBA degree and program requirements can be found on pages 130-131. Graduate-level courses offered by the department are included in the plans of study of graduate students in a wide variety of disciplines.

Undergraduate Programs

Objectives

The programs in the Department of Management and Human Resources are designed to prepare men and women for administrative and leadership positions in business, government, and other institutions. Specialized training is provided in Management and in Human Resource Management, as well as training directed at understanding the broader aspects of business as it functions within a national and international environment. The study of management is approached from an organizational leadership framework.

Management deals with the skills and attributes of organizational leadership. These include the ability to critically assess issues currently facing one's organization or unit; the ability to develop a vision for the organization and translate it into a mission, objectives, and strategies; and the ability to accomplish these through the acquisition and allocation of resources, and organizing, leading, and empowering people.

Human Resource Management deals with those processes which provide, develop, and maintain a productive workforce. Subject areas include recruiting employees, determining what tasks need to be performed, placing the right person in the right position, determining fair benefits and compensation, evaluating performance, determining current and future employment needs, career pathing, training and development, labor-management relations, and following legal/ethical practices in employment.

Requirements for Majors

College of Business Requirements. All students majoring in management or human resource management must satisfy the College of Business requirements, provided on pages 71-72. Academic advising about these requirements is available in the College of Business Student Service Center, Business 306.

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to the College of Business. Students with 1-46 semester credits, who are transferring from other institutions or from other colleges at USU, need a minimum overall GPA of 2.20. Students transferring with 46 or more semester credits are required to have a minimum overall GPA of 2.50. Upon admission, all degree-seeking students will be identified with the College of Business Prespecialization Unit for the purpose of qualifying for advanced standing within their chosen major field. Transfer students and others desiring to be admitted to advanced standing in the Department of Management and Human Resources must meet the prespecialization requirements stated below.

Prespecialization. For approximately the first two years, a student will be identified with the College of Business Prespecialization Registration Unit. The basic objective of this portion of the student's studies is to provide a broad and sound educational foundation upon which to build a specialized education relating to business.

All students at the University are required to satisfy the University Studies (General Education) requirements of the University as described on pages 50-53 of this catalog. Additional requirements for Management and Human Resources majors consist of two basic components.

1. College of Business Prespecialization Core. The following courses are required: MHR 1000, 2990; Acct 2010, 2020; BIS 2450, 2550; Econ 1500, 2010; Math 1050, 1100; Stat 2300; and Psy 1010 or Soc 1010.

2. Department of Management and Human Resources Prespecialization Requirement. The following courses are required for majors in Management and Human Resources: Math 1100; Soc 1010 or Psy 1010; Spch 2600, 3050, or BIS 2450.

Completion of 20 credits of university work with a minimum GPA of 2.2 is necessary before a student is allowed to enroll in BIS 2550; Acct 2010, 2020; and MHR 2990.

Access to 3000-level Management and Human Resources courses is restricted. Only those students who have completed a minimum of forty (40) semester credits with a minimum GPA of 2.50 will be allowed to enroll in 3000-level Management and Human Resources courses.

College of Business Enrollment Restrictions. Admission to the college does not insure access to the prespecialization core courses required for graduation. The following admission requirements must be met by all USU students:

1. An overall GPA (transfer credits included) of 2.20 and 20 semester credits of college-level work are required for admission into Acct 2010, 2020; MHR 2990; and BIS 2550.
2. An overall GPA of 2.50 and completion of 40 semester credits are required for admission into Acct 3110, 3120, 3310, 3410; BA 3080, 3400, 3500, 3700; BIS 3000, 3100, 3140, 3330, 3500, 3550; Econ 3400; and MHR 3110, 3710, 3720, 3810, 3820.
3. All 4000- and 5000-level courses in the College of Business are restricted to students with unconditional Advanced Standing and the continued maintenance of a 2.50 overall GPA.
4. An overall GPA of 2.50, unconditional Advanced Standing, and completion of 84 credits are required for admission into MHR 4880 and 4890.

5. To earn a College of Business bachelor's degree, at least 51 semester credits must be from courses outside the College of Business.

6. Many of the courses in the College of Business require prerequisites. Before registering for courses within the College of Business, students should consult with their adviser or refer to the current *General Catalog* to ensure they have completed the necessary prerequisites.

Advanced Standing. The objective of the advanced standing portion of the program is to provide sufficient specialized business training to prepare the student to successfully enter the business world in a chosen field of interest. The program is also directed at providing the type of business education that develops the attitudes, analytical ability, and the social conscience required for future professional advancement.

Students are required to achieve unconditional advanced standing to be admitted to the Department of Management and Human Resources. Until they have attained unconditional advanced standing, students are not allowed to take 4000-level courses.

The requirements for attaining unconditional advanced standing in the Department of Management and Human Resources are as follows:

1. Students must have completed a minimum of 53 credits and must have earned an overall grade point average (GPA) of at least 2.50 for all the hours of study taken up to the time the petition for advanced standing is made. This will include all transfer credits.

2. Students must have completed the prespecialization requirements for both the College of Business and the Department of Management and Human Resources, as indicated above, and must have earned a GPA of 2.50 or above in these courses.

(Some courses may have prerequisites, and students would be expected to satisfy the course prerequisites as well.)

3. File a request for advanced standing with the College of Business Student Service Center, Business 306.

It is strongly recommended that each student make the transition from prespecialization in the college to unconditional advanced standing in the Department of Management and Human Resources as soon as possible after having met the 53 credit requirement.

Department Core for Both Undergraduate Majors. During the initial portion of the Management and Human Resources upper-division programs, all degree seeking students will be required to take the following core classes, which are designed to provide a broad background in the various areas of business: BA 3400, 3500, 3700; Econ 3400; MHR 3110, 3250, 3710, 3720, 3810, 3820; MHR 4880[2] or 4890[2].

During the latter portion of the program, the student working toward a degree in the Department of Management and Human Resources will be devoting his or her efforts toward fulfilling the requirements in one of the two areas of specialization.

Major in Human Resource Management. In addition to the basic core requirements, students majoring in Human Resource Management must complete the following 12 credits: MHR 4610, 4620; Econ 5670; BIS 4350 or Econ 5660.

Major in Management. In addition to the basic core requirements, students majoring in Management must complete 9 credits as follows: MHR 4710, 4720, and one additional course outside the department, as determined through advisement. Through advisement and proper selection of courses outside the department, a student can accommodate personal goals and objectives, such as entrepreneurship and international study.

If a student elects to take a minor, he or she is encouraged to select one from outside the College of Business.

Requirements for Minors

A minor in Management and a minor in Human Resource Management are available, as outlined below. Any deviation from the programs as outlined must be submitted in writing, with justification for the changes, to the department head for approval. A 2.50 GPA in the minor courses is required.

Minor in Management. This minor is **for students with majors outside the College of Business** who expect to work in an organization where they will assume leadership or management responsibilities. The Management minor consists of 15 credits. MHR 3110 is required and must be taken early in the program. In addition, four courses must be selected from the following: MHR 3710, 3720, 3810, 3820, and 4720.

Minor in Human Resource Management. This minor is **for students with majors outside the College of Business** who want to work in any of the human resource functions of an organization. The Human Resource Management minor consists of 15 credits. The following courses are required: MHR 3110, 3710, and 4610. In addition, two courses must be selected from the following: MHR 3810, 4620; Econ 5670; Econ 5660 or BIS 4350.

Minors for Students with majors within the College of Business. Students with majors within the College of Business may elect to take a minor in either Management or Human Resource Management. In such cases, in consultation with the head of the Department of Management and Human Resources, an appropriate minor will be determined based on the student's career objectives. Students will be expected to complete 15 credits of related coursework beyond the College of Business Prespecialization Requirements and Core Requirements. All such minors must be approved by the head of the Department of Management and Human Resources.

Graduation Requirements

To be recommended by the department for graduation, majors in the Department of Management and Human Resources must have a grade point average of at least 2.50 in their upper-division core and specialization courses, as well as an overall GPA of 2.50. This includes transfer credits. The College of Business requires that at least 60 semester credits be taken in courses taught outside the College of Business. Up to 9 semester credits of economics and 6 semester credits of statistics can be considered as courses taught outside the College of Business. At least fifty percent of the business credits required for a business degree must be taken on the Utah State University campus or at a designated residence center.

Financial Assistance

The Department of Management and Human Resources and the College of Business award scholarships in addition to those available through the University Financial Aid Office. Information and application forms are available from the College of Business Student Service Center Office, Business 306.

Student Organizations

The department sponsors two student organizations. Membership in the organizations is open to all students, both undergraduate and graduate, who meet the membership requirements.

Sigma Iota Epsilon (SIE) is a national Honorary Management Fraternity sponsored by the Academy of Management.

Society for Human Resource Management (SHRM) is the professional Human Resource Management organization co-sponsored by the Bridgerland Chapter of SHRM.

Graduate Programs

Human Resource Management Specialization in the Master of Social Sciences (MSS)

The MSS is an interdisciplinary degree involving social science courses designed to provide breadth in content and the perspective of the social and work environment in which people operate (see pages 353-354). The Human Resource Management specialization deals with those processes which provide, develop, and maintain a productive work force. Subject areas include human resource planning, recruiting, selection, placement, benefits and compensation, performance management, career planning, training and development, labor/management relations, and ethical/legal employment practices.

A dynamic and changing work environment within an increasingly complex social environment provides unique challenges and opportunities for students in this discipline. One focus of this degree is to prepare students for professional certification by the Human Resource Certification Institute. The director of the MSS/HRM program has information on the institute and its accreditation designations.

The program is flexible and is designed to achieve a balance between meeting the professional goals of students, while at the same time ensuring coverage of the Human Resource Management discipline.

This degree is available in a distance education format, as well as on campus. For details, contact the department.

Admission Requirements

See Admission Procedures on pages 60-61. Students are required to submit scores on either the Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT). Prospective students may request information on the expected test performance standards for acceptance. Applicants are expected to have strong written and oral communication skills.

This program is open to students with a variety of undergraduate majors. However, students who have specialized in human resources at the undergraduate level should see the program director for advisement.

Students are expected to be admitted to the program as matriculated students before taking coursework leading to the degree. However, to accommodate unique situations that exist with some prospective students or individuals who may simply be interested in the course content, students may be permitted to take a class providing space is available and written permission is obtained from the Director of the MSS/HRM Graduate Program. A letter explaining reasons and intentions must be submitted by the student making the request.

Degree Requirements

Students are held responsible for meeting requirements as outlined in this catalog. Requirements specific to this degree are outlined below. It is the student's responsibility to be aware of all requirements and initiate the resolution of apparent inconsistencies.

The typical degree option is Plan C, which includes coursework to meet the degree requirements. The student should consult with the MSS/HRM Program Director if the Plan B option is being considered.

A minimum of 36 semester credits is required for the degree. Under Plan C, no thesis credit is allowed. The required core courses include a capstone course which meets the requirement of a Plan C culminating experience. A maximum of three credits may be earned either from readings/conferences or from independent research. A maximum of three supervised internship credits is also permitted. Eighteen (18) credits are taken from the MHR Department. In addition, a minimum of 6 credits in each of two cooperating minor disciplines, or 6 credits in a cooperating minor and a minimum of 6 credits in a cluster, is required. A cluster is a grouping of courses outside of the major and the minor which is complementary to the degree and which meets the professional goals of the student. All clusters must be approved by the Program Director. In some instances, a minor from a discipline other than the cooperating minor disciplines may be approved. A list of cooperating minor disciplines and preapproved courses is available from the MSS/HRM Program Office in the Management and Human Resources Department. Up to 3 credits of 3000- or 4000-level coursework may be included in a program of study with the prior approval of the MSS/HRM program director and the dean of the School of Graduate Studies (see page 62).

Required courses include: MHR 6510, 6550, 6630, 6650, 6690, 6760; Econ 5680, 6670; Econ 6660 or BIS 6350; and Soc 6100 or Psy 6010. If a student has taken a comparable course, an acceptable substitute may be approved by the Director of the MSS/MHR Graduate Program.

Prior to taking any course, or early in the program, the student must complete MHR 6080. Since students enter the program from a variety of undergraduate disciplines, this course is designed to provide a common context for all students. Although required, it is not considered part of the 36 semester credits required for the degree. This course is offered by Independent Study, and is therefore available at any time. Students who feel the course would be repetitious, and would not provide added value to their background, may submit a written petition for waiver, providing a justification for the request. Further information or assistance can be obtained from the MSS/HRM Program Office.

Financial Assistance and Assistantships

A limited number of graduate assistantships, scholarships, and

other departmental awards are provided to outstanding students on a competitive basis. Acceptance to the program does not guarantee financial assistance. Application forms are available from the MHR Department.

Additional Information

Additional information about the MSS/HRM degree may be obtained by contacting the Department of Management and Human Resources.

For additional information about the MSS degree, see *Interdepartmental Program in Social Sciences*, on pages 353-354 of this catalog. For details about other MSS programs, see program descriptions in the Department of Economics (pages 173-174), the Department of History (pages 235-236), and the Department of Sociology, Social Work and Anthropology (page 360).

Master of Business Administration (MBA)

The department also participates with other departments in the College of Business in offering the Master of Business Administration (MBA) Degree. A description of the MBA degree and program requirements can be found on pages 130-131 of this catalog.

Management and Human Resources Courses (MHR)

1000. Business Orientation. Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (0.5F,Sp)

1160. Developing Self-Management Skills. A practical course designed to provide basic self-management skills contributing to personal effectiveness. For freshmen and sophomores only. (1F,Sp,Su)

2160. Student Applied Leadership Training. Available to students involved in structured leadership training provided as part of their role and responsibility at the University. For details, contact the Office of Advising and Transition Services (SC 302). Prerequisite: Approval of course coordinator. (1-3F,Sp,Su) ®

2250. Introductory Internship. Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. (1-9F,Sp,Su) ®

2350. Small Business Management. Provides practical overview of management principles and practices as they apply to the small business enterprise. For nonbusiness majors. (3Sp) ©

2990. Legal and Ethical Environment of Business. Surveys the legal and ethical environment of business. Introduction to elementary legal research and writing and critical thinking techniques. Lecture and laboratory. (3F,Sp,Su)

DSS 3110. Managing Organizations and People. Overview of the role of management, and an introduction to leadership theory and practice. Includes defining of mission and goals, organizing work, and managing human performance. (3F,Sp,Su) ©

3250. Discussions With Business Leaders. Students attend Partners in Business Program seminar sessions to examine new methods for improving performance in organizations. Repeatable to a maximum of 1.5 credits. (0.5F,Sp) ®

3710. Developing Team and Interpersonal Skills. Experientially-driven course focusing on the role of teams in organizations and on developing skills which individuals and teams need to be effective. Topics include self-awareness, supportive communication, problem solving, and conflict management. (3F,Sp,Su)

DSS 3720. Leadership, Ethics, and Organizational Change. Focuses on leaders trying to design and implement change within organizations. Explores how leaders frame and reframe issues for themselves and others, create paradigm shifts, engage in critical thinking, and make ethical decisions. Prerequisite: MHR 3110. (3Sp)

DSS 3810. Employment Law and Policy Development. Examines laws related to employment, labor relations, civil rights, compensation, safety, health, and retirement. Provides hands-on experience in drafting and reviewing human resource policies in a business setting. Addresses implementing and influencing public policy. Prerequisite: MHR 2990. (3F)

DSS 3820. International Management. Exploration of international culture and context of management, the impact of globalization on businesses today, and the pressures and complexities of operating in global markets, including the processes of managing multi-cultural human resources. (3Sp)

4250. Advanced Internship. Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. (1-9F,Sp,Su) ®

4610. Human Resource Planning and Staffing. Human resource planning and staffing from a strategic perspective. Includes job analysis and work design, recruitment, management selection and placement, human resource information systems, and statistical applications in human resource management. (3F)

4620. Compensation and Benefits. Strategies, processes, and principles of compensation. Includes performance management and measurement, base pay systems, pay for performance, noncash compensation, executive compensation, and benefits design. Prerequisite: MHR 4610. (3Sp)

4710. Senior Leadership Project. Students plan and complete advanced leadership projects, present results, and document accomplishments. Students gain practical experience and demonstrate ability to manage complex projects, contributing to organizational goals and their own career objectives. Prerequisite: Senior standing. (3F)

4720. Scholarly Explorations in Management. Senior management students participate in a scholarly seminar of business and management history, as a context for appreciating contemporary leadership practice. Students critically evaluate competing paradigms and the development of executive leadership skills. Serves as a capstone course for management majors. (3Sp)

4800. Independent Research and Readings. Provides opportunity for student to pursue special interests under tutorship of faculty. Prerequisite: Approval of faculty member and department head. (1-3F,Sp,Su) ®

CI 4880. Business Strategy in an Entrepreneurial Context. Integrative capstone course dealing with processes, methods, and steps involved in starting and growing small to mid-size business ventures. Emphasizes cross-functional challenges of market entry, finance, operations, managing business growth, and entrepreneurs' responsibilities to society. Prerequisites: Senior standing; MHR 3110, BA 3400, 3500, 3700. (3Sp)

CI 4890. Business Strategy in a Global Context. Integrative capstone course dealing with challenges and strategies associated with international business. Students develop global business judgment and perspective through addressing problems related to global market entry and growth, finance, operations, strategic alliances, social responsibility, and business-government relationships. Prerequisites: Senior standing; MHR 3110, BA 3400, 3500, 3700. (3F,Sp,Su)

4950H. Senior Honors Thesis/Project. Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (3Sp)

5640 (d6640).[1] Selected Topics in Management and Human Resources. Selected

topics in management and/or human resources are pursued in depth. Topics and instructor may vary. (1-3) ®

6010. Advanced Business Law. Detailed investigation of business law, including law of contracts, torts, property, secured transactions, commercial paper, and business organizations. Prerequisite: MHR 2990. (3Sp)

6080. Fundamentals of Business. Guided self-study providing overview of business operations for students without an undergraduate degree in business or equivalent life experiences. Credit earned does not count toward requirements for MSS degree. Enrollment limited to new students entering the MSS Human Resource Management program. (3F,Sp,Su) ©

6160. Integrative Pre-MBA Core. Integrates financial reporting, analysis, and markets; domestic and global economic and legal environments; creation and distribution of goods and services; and human behavior in organizations. Upon completion, students without undergraduate degrees in business are prepared to enter advanced MBA core. (18Su)

6180. Intrasession MBA Workshop. Intensive workshops designed to enhance the MBA experience. (0.5-1) ®

6250. Graduate Internship. Graduate-level internship in a career-related position for graduate students wishing to develop or expand their occupational experience. Maximum of 6 credits. (1-6F,Sp,Su) ®

6350. Contemporary Manufacturing Management. Examines contemporary principles, techniques, and research findings of high-performance manufacturing. Analysis of leading models of management and continuous improvement, based upon best company practices, particularly lean, just-in-time manufacturing. (3F)

6370. Project Management. Teaches concepts of project management, while intensively involving students in production and operations related projects. Requires integrative organizational and industry research and a professional report. (3Sp)

6410. New Venture Creation. Focuses on development of new ventures, including entrepreneurial competencies, venture teams, recognizing business opportunities, gathering resources, new venture finance, entry strategies, legal structure, licensing and regulatory requirements, patents, copyrights, and product liability. (3F)

6430. New Venture Growth and Expansion. Analyzes the growth phase of business development. Topics include organizational competencies and systems, growth strategies, growth finance and staging, cash-flow, franchising, estate and family business issues, harvest strategies including buyouts and public offerings, and employment law for small employers. (3Sp)

6470. Entrepreneurship Project. Teaches concepts of project management, while intensively involving students in entrepreneurship-related projects such as initiating a start-up or consulting with management of an emerging business. Requires integrative organizational and industry research and a professional report. (3Sp)

6500. Managing Individuals and Groups. Focuses on development of interpersonal and team skills. Includes development of organizational systems supporting effective use of human resources, including performance management, motivation, selection, training, rewards, and career development. (3F)

6510. Performance Management. Introduces Human Resource Management, and then undertakes an in-depth analysis of performance management process, including job analysis, cognitive issues, choice of raters, performance feedback, employee motivation and discipline, and training for improvement of individual performance. (3F)

6550. Human Resource Planning and Staffing. Focuses upon creation of competitive advantage through strategic human resources planning and staffing. Topics include job analysis, preparing candidate specifications, recruitment, assessment, and placement. Also covers pertinent laws/regulations and applicable descriptive/inferential statistics. (3F)

6630. Compensation and Benefits. Strategic analysis of compensation and benefits policies and programs. Includes job evaluation systems, job pricing, wage and salary surveys, statistical methods used in compensation, group and individual pay for performance, executive compensation, and employee benefits. (3Sp)

6640 (d5640). Selected Topics in Management and Human Resources. Selected topics in management and/or human resources are pursued in depth. Topics and instructor may vary. (1-3) ®

6650. Team and Interpersonal Effectiveness. Experiential course designed to develop team effectiveness, and specific managerial and leadership skills contributing to interpersonal competence and effectiveness in work groups and organizations. (3F)

6670. Employee Relations and the Labor Movement. Comprehensive survey of union-management relationships, including labor markets and the labor movement, labor history and law, union organization and government, and contract negotiation and administration. Includes exercises and cases in negotiations and grievance processes. Prerequisite: MHR 6760. (3Sp)

6690. Human Resource Policy and Strategy. Capstone course in Human Resource Management, designed to integrate concepts learned in specialized courses to the management of a total Human Resource function, with integration from both strategic and tactical perspective. Covers domestic and international issues. (3Sp)

6760. Employment Law. Examines laws related to employment, labor relations, civil rights, compensation, safety, health, and retirement. Provides experience in dispute resolution techniques in a nonunion employment setting, including negotiation, mediation, and arbitration. (3F)

6890. Global Business Strategy. Integrative capstone course, taking a CEO's perspective, addressing global competitiveness, strategic assessment, policy development, and strategy execution. Must be taken at end of advanced MBA core. (3Sp)

6900. Independent Research and Readings. Provides opportunity for students to pursue special interests under tutorship of the faculty. Prerequisite: Approval of faculty member and department head. (1-3F,Sp,Su) ®

6960. Professional Paper. Preparation of paper of professional quality, designed to demonstrate ability to complete a major project and effectively present the results. (3)

6970. Thesis. Designed for students preparing a master's degree thesis. (1-4F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

[2]MHR 4880 and 4890 are both capstone courses, and should not be taken until near the end of the senior year. MHR 4880 should be taken by Management majors.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

Department of
Mathematics and Statistics

College of Science

Interim Head: Associate Professor *E. Robert Heal*, analysis, statistics, mathematics education
Office in Lund Hall 211, (435) 797-0244

Assistant Head: Associate Professor *Richard Cutler*, generalized linear models
Graduate Program Coordinator: Professor *Renate Schaaf*, nonlinear differential equations

Mathematics Education Program Director: Professor *James S. Cangelosi*, mathematics education

FAX (435) 797-1822
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Professors *Ian M. Anderson*, differential geometry, global analysis; *LeRoy B. Beasley*, matrix theory, linear algebra, combinatorics; *Lawrence O. Cannon*, topology, mathematics education; *Chris S. Coray*, numerical analysis; *Lance L. Littlejohn*, differential equations, special functions; *L. Duane Loveland*, geometric topology, continuum theory; *Jerry Ridenhour*, differential equations; *Donald V. Sisson*, statistical methods, experimental design; *Russell C. Thompson*, differential equations; *Zhi-Qiang Wang*, nonlinear differential equations, nonlinear analysis; *Stanley C. Williams*, measure theory, modern analysis; **Professors Emeriti** *Ronald V. Canfield*, multivariate and industrial statistics; *Joe Elich*, mathematics education; *Konrad Suprunowicz*, logic; *David White*, categorical data analysis; **Associate Professors** *Daniel C. Coster*, experimental design, linear models; *Adele Cutler*, statistical computing; *Kevin Hestir*, applied probability; *Joseph V. Koebbe*, numerical analysis, applied mathematics, computational fluid dynamics; *Michael C. Minnotte*, nonparametric density estimation, statistics; *Daniel K. Nakano*, algebra; *James Powell*, applied mathematics, mathematical biology; *Emily F. Stone*, dynamical systems; *Kathryn Turner*, numerical analysis, optimization, linear algebra; **Adjunct Associate Professor** *David L. Turner*, applied statistics, applications in forestry; **Associate Professors Emeriti** *Robert G. Hammond*, mathematics education; *Wayne R. Rich*, mathematics education; *E. Eugene Underwood*, matrix theory, linear algebra; *James D. Watson*, numerical analysis; **Assistant Professors** *H. Olcay Akman*, reliability theory, statistical modeling; *Mark E. Fels*, differential geometry; *Xiaofeng Ren*, partial differential equations, applied mathematics; *Dariusz M. Wilczynski*, topology; *Xiadong Zheng*, computer-intensive methods, statistical model selection, nonparametric statistics; **Principal Lecturers** *David D. Bregenzer, Beverly Ridenhour, Eric Rowley*

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Mathematics; BS and BA in Mathematics Education; Master of Mathematics (MMath); BS, BA, and MS in Statistics; Doctor of Philosophy (PhD) in Mathematical Sciences

Graduate specializations: *PhD in Mathematical Sciences*–College Teaching, Interdisciplinary Studies, Pure and Applied Mathematics, and Statistics

Undergraduate Programs

Objectives

The Department of Mathematics and Statistics offers a variety of programs and courses designed to prepare students for careers in teaching and for positions as mathematicians and statisticians in industry and government. The department also provides service courses for students in many other disciplines and contributes to the University Studies program by providing Quantitative Literacy and Quantitative Intensive classes.

Placement of New Students

The mathematics ACT score and Advanced Placement (AP) calculus and statistics scores are used for placement in 1000-level and 2000-level mathematics and statistics courses. New students and students who are registering for a math class at USU for the first time should have a math ACT score of at least 18 to register for Math 1010 (Intermediate Algebra), and a score of at least 23 to register for Math 1050 (College Algebra) and Math 1060 (Trigonometry). The alternative to this is to take a placement examination in the Testing Services Office, University Inn 115. A student who has already taken a math class at USU may register for the next higher numbered course, providing he or she received a grade of *C-* or better in the prerequisite course. Entering students with math ACT scores of less than 18 should register for Math 0900 (Elements of Algebra) or take the placement examination to qualify for a higher-level course. The placement exam requires a small fee.

Entering students with passing scores on AP calculus or statistics exams will be given 8 semester credits in mathematics for passing either one of the calculus exams, and 4 semester credits for passing the statistics exam. Usually at least part of this credit will be for specific USU courses. Students with an AP calculus AB score of 3 will generally be advised to start in Math 1210 (Calculus I). Students with a score of 4 or 5 on the calculus AB exam will be given credit for Math 1210, and will be advised to begin in Math 1220 (Calculus II). Students with an AP calculus BC exam score of 3 or 4 will also be given credit for Math 1210, and advised to begin in Math 1220. Students with a score of 5 on the calculus BC exam will be given credit for Math 1210 and 1220, and advised to begin in Math 2210 (Multivariable Calculus). Students with a score of 3 or higher on the AP statistics exam will be given credit for Stat 2000.

The calculus courses Math 1210, 1220, and 2210 are designed for students in mathematics, the sciences, and engineering. Math 1100 (Calculus Techniques) is designed primarily for students in business and a few other majors. All students in calculus classes need strong backgrounds in the material covered in Math 1010 and Math 1050. In addition, the Math 1210, 1220, 2210 sequence requires trigonometry (Math 1060) and a graphics calculator.

Students with outstanding mathematics records in high school and transfer students with some experience in calculus may wish to consult with a departmental adviser prior to registration.

Departmental Admission Requirements

1. New freshmen admitted to USU in good standing qualify for admission to the major.
2. Transfer students from other institutions need a 2.2 transfer GPA, and students transferring from other USU majors need a 2.0 total GPA for admission to this major in good standing.
3. Students may be admitted to the Mathematics Education major by satisfying either of the above conditions. However, in order to be admitted to the Professional Education Program, and to graduate from the Mathematics Education major (and minor), students must have a cumulative GPA of at least 3.0 in the equivalent of Math 1210, 1220, and 2210, and an overall GPA of at least 2.75.

University Requirements

All students in the Department of Mathematics and Statistics must satisfy the requirements of USU's University Studies program, described on pages 50-53 of this catalog.

College of Science Requirements

Every bachelor's degree candidate in the College of Science must complete the following coursework or its equivalent:

1. One year of calculus: Math 1210 and 1220. In some degrees or options within degrees, the second semester of calculus may be replaced by Stat 3000. The substitution will be for specific degree programs, not by student choice.

2. One of the following year-long sequences: Biol 1210, 1220; Chem 1210, 1220; Geol 1150, 3200; Phyx 2110, 2120; Phyx 2210, 2220. The chosen sequence must be *outside the student's major department*.

Bachelor of Arts (BA) Degree

For this degree, students must complete the major requirements for the corresponding BS degree, plus the equivalent of two years of training in a foreign language. The Languages and Philosophy Department is responsible for approving the foreign language coursework for this degree.

Major Requirements

Major and minor requirements in the Department of Mathematics and Statistics vary from time to time. Students may obtain from the department information about the exact requirements in effect at any given time. Major and minor requirements in effect at the beginning of Fall Semester 1998 are given below.

Mathematics Major. Math 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, and 5710; any two courses (6 credits) from Math 5110, 5220, 5270, 5310, and 5510; any three additional courses (9 credits) in mathematics at the 5000-level, excluding Actuarial Mathematics (Math 5570, 5580). Note: Math 2250 may substitute for both Math 2270 and 2280; however, Math 2270 and 2280 are recommended for students wishing to pursue graduate study in mathematics.

Mathematics Education Major. Stat 1040; Math 1210, 1220, 2210, 2270, 2280, 3110, 4200, 4310, 4400, 4620, and 5710; *Professional Education Component:* Level 1–InsT 3000, ScEd 3100, 3200, Math 3300, 4500; Level 2–ScEd 4100, 4200, SpEd 4000, Math 4300; Level 3–ScEd 5100, 5200, 5300, 5500, 5600. Note: Math 2250 may substitute for Math 2270 and 2280. Admission to the Professional Education Program requires a GPA of at least 3.00 in the equivalent of Math 1210, 1220, and 2210, and an overall GPA of at least 2.75. Graduation from this major also requires an overall GPA of at least 2.75. No more than three repeats in *all* required courses may be used in GPA computations. The Secondary Education Professional Component is to be completed during the last three semesters of the degree program, and consequently nearly all the mathematics classes in the Mathematics Education Major must be completed before beginning the Professional Component.

Statistics Major. Math 1210, 1220, 2210, 2270, 4200, 5710 and 5720; CS 1700; Stat 2000 or 3000; Stat 4920, 5100, 5200, 5890; any three additional statistics classes (9 credits) at the 5000-level. One of the three additional classes may be selected from Math 4630, 5570, 5610, and 5760. Note: Math 2250 may substitute for Math 2280.

Computational Mathematics Option. Math 1210, 1220, 2210, 2270, 2280, 3310, 4200, 5210, 5610, 5620, and 5710; two courses (6 credits) in mathematics at the 4000-level or above, not including Actuarial Mathematics (Math 5570, 5580); CS 1700, 1710, 1720, 2200, and 2370; any two computer science courses numbered above 4000. Note: Math 2250 may substitute for Math 2270 and 2280. Only one of Math 4620 and 4630 may be counted towards the elective mathematics credit requirement. Students who complete the computer science coursework with a GPA of at least 2.5 automatically earn a minor in computer science.

Actuarial Science Option. Math 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5570, 5580, 5710, 5720; Stat 2000 or 3000; Stat 4920, 5100; CS 1700; Acct 2010; Econ 2010; BA 3400; one business administration course (3 credits) numbered above 4000. Note: Math 2250 may substitute for Math 2270 and 2280. Admission to this option requires explicit departmental approval. In order to graduate from the Actuarial Science Option, all students must pass the Society of Actuaries Exam 100.

Students who are interested in two or more major areas (in different departments) should consult with a departmental adviser to discuss the possibility of an individually designed degree program. Such programs typically entail completing major requirements in two or more departments, but cooperating departments may agree to waive some requirements in each department to facilitate a dual or triple major.

Mathematics-Statistics Major. Math 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, 5710, and 5720; Stat 2000 or 3000; Stat 4920, 5100, 5200, 5890; CS 1700; at least two mathematics courses (6 credits) numbered above 5000; at least two statistics courses (6 credits) numbered above 5000. Note: Math 2250 may substitute for Math 2270 and 2280. Either Math 5570 or 5760 may substitute for one of the statistics elective courses.

Mathematics-Physics Major. Math 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, 5710; Phyx 2210, 2220, 2710, 3550, 3600, 3650 or 3700, and 4900; two additional courses in mathematics numbered above 4600; 8 additional credits in physics numbered above 3500, excluding University Studies Depth courses. Note: Math 2250 may substitute for Math 2270 and 2280. Only one of Math 4620 and 4630 may count towards the elective credit in mathematics. Phyx 2110 and 2120 may substitute for Phyx 2210 and 2220.

Mathematics-Electrical Engineering Major. All courses in the Electrical Engineering major; Math 1210, 1220, 2210, 2250, 4200, 4310, 5210, 5710; and three additional courses (9 credits) in mathematics numbered above 4600, excluding Math 5570 and 5580. Note: Only one of Math 4620 and 4630 may count towards the elective credit in mathematics.

Mathematics Minor. Math 1210, 1220, 2210, 2270, 2280; two courses (6 credits) in mathematics numbered above 4000, excluding Math 4300, 4400, 4500, and 4620. Note: Math 2250 may substitute for Math 2270 and 2280.

Statistics Minor. Stat 2000 or 3000; Stat 5100, 5200; two courses (6 credits) from statistics courses numbered above 5000 or from Math 5710, 5720, and 5760.

Mathematics Education Minor. Stat 1040; Math 1210, 1220, 2210, 2270, 3110, 4620; Math 4200 or 4310; Math 4500; Professional Education Component for the student's Secondary Education major. Note: Math 2250 may substitute for Math 2270. Admission to the Professional Education Program requires a GPA of at least 3.0 in the equivalent of Math 1210, 1220 and 2210, and an overall GPA of at least 2.75. Graduation from this minor also requires an overall GPA of at least 2.75. No more than three repeats in *all* required courses may be used in GPA computations. The Secondary Education Professional Component is to be completed during the last three semesters of study, and consequently nearly all the mathematics classes in the Mathematics Education Minor must be completed before beginning the professional component.

Biomathematics Minor. Biol 1210, 1220, 1230, 1240; Math 1210, 1220, 2270, 2280; Stat 3000; Math/Biol 4230. Biology majors must take one course from the biology electives (listed below), and two courses from the mathematics and statistics electives (listed below). Mathematics and Statistics majors must take two courses from the biology electives, and one course from the mathematics and statistics electives. All other majors must take two courses from each set of electives. *Biology Electives:* Biol 4510, 5170, 5200, 5500; PubH 5330; FW 3400; Bmet 5500. *Mathematics and Statistics Electives:* Math 4620, 4630, 5410, 5420, 5460, 5610, 5620, 5710; Stat 5100, 5110, 5120, 5200, 5300, 5600.

Additional Information

Students who enter the University with AP credit in Mathematics and/or Statistics, and about 30 additional AP or CLEP credits, may be able to complete both a BS and an MS degree within five years or less. Interested students should consult with a departmental undergraduate adviser.

Financial Support

The department offers a four-year scholarship to superior high school students who enroll as full-time Mathematics, Mathematics Education, or Statistics majors. The winner of the Hunsaker Scholarship receives a cash award of $500 per semester for two years. This award is given in addition to any four-year scholarship or tuition waiver for which the student is eligible. During the final two years, the recipient is expected to work as a grader or tutor for the department. The department also offers two other scholarships (Elich and Ellis). The amount of these scholarships and recipients varies from year to year. To apply for any of these scholarships, send a statement of qualifications, including high school transcripts and SAT or ACT scores, and three letters of recommendation to:

Scholarship Committee
Department of Mathematics and Statistics
Utah State University
3900 Old Main Hill
Logan UT 84322-3900

Applications must be received by April 1.

Graduate Programs

Admission Requirements

See the general admission requirements for graduate programs at Utah State University on pages 60-61 of this catalog. In general, students wishing to pursue graduate studies in mathematics or statistics should have a bachelor's degree in mathematics, statistics, or a closely related field, with extensive coursework in one of the departmental disciplines.

Students entering the Master of Mathematics (MMath) program must either possess a valid secondary school teaching certificate or be concurrently enrolled in a secondary school teacher certification program.

Degree Programs

Master of Science (MS). The department offers MS programs in mathematics and statistics. This degree is a terminal degree for most students, but is also a “stepping stone” for students who ultimately wish to pursue a doctorate in mathematics or statistics.

Master of Mathematics (MMath). This program is designed specifically for secondary school teachers of mathematics. The purpose of this degree is to provide students with a broad background in mathematics.

Doctor of Philosophy (PhD) in Mathematical Sciences. This is a terminal degree for mathematics and statistics researchers in academe, government, and industry, as well as for prospective college teachers.

Specializations for PhD in Mathematical Sciences

The **College Teaching Specialization** is designed to prepare students to teach undergraduate mathematics in two- and four-

year colleges and in universities. This program is less specialized than the other two options. Students in the College Teaching specialization receive broad training in pure and applied mathematics. The dissertation for this specialization includes exposition of important mathematical theories and their historical relationships in an area of mathematics of the student's choosing.

The **Interdisciplinary Studies Specialization** offers advanced training in mathematics as a research tool. The mathematical component emphasizes areas of applied mathematics. In addition, the student receives graduate-level training in the chosen area of application. The student's course of study and research is directed both by scholars in mathematics and by scholars in the related discipline. The dissertation involves the development and application of mathematics in the context of research problems arising in the chosen interdisciplinary area.

The **Pure and Applied Mathematics Specialization** is a traditional doctoral program in mathematics, offering broad training in the foundations of modern mathematics together with specialized training in an area of mathematical research. The dissertation represents a significant contribution to mathematics research in the chosen area of specialization.

The **Statistics Specialization** offers broad training in theoretical and applied statistics for students seeking careers in academia, industry, or government. The dissertation represents a significant contribution to statistical research.

Course Requirements

Departmental requirements change from time to time. Check with the Department of Mathematics and Statistics for the list of requirements currently in effect. The requirements listed below are in effect for Fall Semester 1998.

Master of Science in Mathematics. This degree requires 30 credits of approved coursework at or above the 5000 level. At least 18 of these credits must be at the 6000 level or above, excluding Math 6990 and 7990 (Continuing Graduate Advisement) and Math 7910 (College Teaching Internship). Generally, most of the coursework will be in mathematics, but the student's supervisory committee may approve courses in statistics, physics, engineering, or any other discipline, if it seems such coursework is appropriate for the student's program of study.

The MS in mathematics has three options. The Plan A or the thesis option requires taking 6 credits of Math 6970 (Thesis and Research) and working with a faculty member on a substantial research project. The research must be presented in a thesis, which must be approved by the student's supervisory committee and the dean of the School of Graduate Studies. An oral defense of the thesis must be arranged through the School of Graduate Studies.

The Plan B or project option requires taking 3 credits of Math 6970 and working with a faculty member on a smaller research project. A written report of the research must be approved by the student's supervisory committee. An oral defense of the report must be scheduled through the School of Graduate Studies.

The third option of the MS in Mathematics requires only coursework, and is called the Plan C option.

All students in the MS program in Mathematics must pass a written qualifying examination covering the introductory analysis and advanced calculus material presented in Math 4200, 5210, and 5220. Students may take this exam before beginning formal coursework in the MS program, and must take the exam at the end of the first full year of matriculation. The exam is normally given twice a year, in late May and early August. Matriculated students who fail on their first try must pass the exam at the next scheduled opportunity. A detailed exam syllabus is contained in the *Graduate Handbook*, available from the department.

Master of Science in Statistics. This degree requires 30 credits of approved coursework at or above the 5000 level. At least 18 credits must be at the 6000 level or above, excluding Stat 6990 and Stat 7990 (Continuing Graduate Advisement). All students must take Stat 6710 and 6720 (Mathematical Statistics I and II). Generally, most of the coursework will be in statistics, but the student's supervisory committee may approve courses in mathematics, biology, economics, or any other discipline if it deems such coursework to be appropriate for the student's program of study.

The MS in statistics has Plan A (thesis), Plan B (report), and Plan C (coursework only) options. The Plan A and Plan B options require students to work with a faculty member on a research project, taking 6 or 3 credits of Math 6970, respectively, and presenting the results of the research in a written report. For both the Plan A and Plan B options, the report must be approved by the student's supervisory committee. A Plan A report (thesis) must also be approved by the dean of the School of Graduate Studies. Both Plan A and Plan B reports require an oral defense that must be scheduled through the School of Graduate Studies.

Students in all three options of the MS in Statistics must pass a written qualifying examination based on the material presented in Stat 3000 (Statistics for Scientists), Math 5710 (Introduction to Probability), and Math 5720 (Introduction to Mathematical Statistics). Students may take the exam before beginning any formal coursework in the MS program. Students must attempt the exam by the end of the first full year of matriculation. The exam is usually given in late May and early August each year. Matriculated students who fail the exam on their first try must pass the exam at the next scheduled opportunity. A detailed exam syllabus is available in the *Graduate Handbook*, available from the department.

Master of Mathematics. This program requires at least 36 credits approved by the Graduate Committee within the Department of Mathematics and Statistics. At least 21 of these credits must come from mathematics classes numbered above 5000. Math 4620 or an approved substitute must also be included. The GPA for the 36 credits and for the 21 math credits must be at least 3.0.

The Departmental Graduate Committee supervises all MS and MMath students until a supervisory committee for the student is established and approved. Prior to advancement to candidacy, students in Plan A and Plan B options for the MS degree in mathematics and statistics must pass an examination in English writing. This exam is administered by the Department of Mathematics and Statistics.

PhD in Mathematical Sciences. In all the doctoral specializations, a course of study consists of 90 credits beyond a bachelor's degree or 60 credits beyond a master's degree. The minimal course requirements described below assume that the student needs 90 credits. In all specializations, credit may be earned toward a master's degree, as part of the 42 required credits (see below), but coursework cannot be applied to two degrees.

The complete course of study must be approved by the student's supervisory committee.

College Teaching Specialization. Seven course sequences (42 credits) in mathematics courses numbered 6000 and above, excluding Math 7970 and including at least 6 credits in seminars and topics courses in mathematics at the 7000 level and 6 credits of Math 7910 (College Teaching Internship), are required.

Interdisciplinary Studies Specialization. Forty-two (42) credits in courses numbered 6000 and above, excluding Math 7970 and including at least four course sequences (24 credits) in mathematics, 6 credits in seminars and topics courses in mathematics at the 7000 level, and approved courses in the student's interdisciplinary area, are required.

Pure and Applied Mathematics Specialization. Seven course sequences (42 credits) in mathematics courses numbered 6000 and above, excluding Math 7970 and including at least 6 credits in seminars and topics courses at the 7000 level, are required.

Statistics Specialization. Seven course sequences (42 credits) in mathematics or statistics in courses numbered 6000 and above, excluding Math 7970 and Stat 7970 and including at least 6 credits in seminars and topics courses at the 7000 level, are required.

For all students in the Pure and Applied Mathematics, the Interdisciplinary Studies, and the Statistics specializations, a maximum of 30 credits of Math 7970 (Dissertation Research) is allowed. Students in the College Teaching Specialization are allowed a maximum of 20 credits of Math 7970.

Besides the coursework described, the general requirements for the PhD include:

1. Competency in advanced calculus.
2. Competency in a foreign language.
3. Passing three written comprehensive examinations. The exams are given in May and August. Some latitude in subject is permitted, although all students in mathematics must pass an examination in real analysis. All comprehensive exams in mathematics and statistics must be passed within a single 13-month period. This period begins with the first sitting for such an examination, but may not begin later than the September following the first full academic year as a matriculated PhD student. Students are encouraged to sit for all three exams within a 7-day period, but sitting for fewer is permitted. A student need not repeat exams already passed. For the Statistics Option, all students must pass three written exams, two of which must be examinations in probability, linear models, or mathematical statistics. Detailed syllabi for all exams may be obtained from the Department of Mathematics and Statistics. Old tests are also available.
4. Completion of an examination in English writing.
5. Completion of a dissertation.
6. Passing a final oral examination defending the dissertation and demonstrating a general knowledge of mathematics.

Research

Mathematics research opportunities within the department are many and varied, and students are urged to contact faculty about mutual interests at as early a stage as feasible. The interdisciplinary option permits and encourages study with a broad spectrum of outstanding nationally recognized University research programs.

Financial Assistance

The department offers full-time teaching assistantships, half-time paper-grading assistantships, research fellowships, and work-study assistance for students in all graduate degree programs. Stipends vary from $6,000 for a half-time paper-grading assistantship to $13,000 for teaching assistants pursing a master's degree. Stipends for PhD students, which include summer support for teaching a class or working on a research project, range from $16,000 for incoming students to $18,000 for students who have passed all three comprehensive examinations. Normally, a teaching assistant has responsibility for a single course each semester. Out-of-state tuition waivers are usually given with each full-time teaching or half-time paper-grading assistantship. Applications for teaching assistantships should be mailed by March 1 of each year.

Mathematics Courses (Math)

0900. Elements of Algebra. Review of elementary algebra in preparation for Math 1010. Remedial class not carrying USU or transfer credit. Remedial fee required. (3F,Sp,Su) ©

1010. Intermediate Algebra. Linear equations and inequalities, polynomials and exponents, rational expressions, roots and radicals, quadratic equations, lines and systems of linear equations. Prerequisite: Math 0900 or Math ACT score of at least 18, or successful completion of placement test. Required for entrance to USU. Course fee required. (3F,Sp,Su) ©

QL 1030. Quantitative Reasoning. Exploration of contemporary mathematical thinking, motivated by its application to problems in modern society. Emphasizes development of skill in analytical reasoning. Prerequisite: Math ACT score of at least 23, satisfactory score on placement exam for Math 1050, or Math 1010. (3F,Sp,Su)

QL 1050. College Algebra. Real and complex number systems, graphs, inverse functions, polynomial and rational functions, exponential and logarithmic functions, systems of equations, elementary matrix algebra, induction, binomial theorem, permutations and combinations. Graphing calculator required. Prerequisite: Math 1010, or Math ACT score of at least 23, or satisfactory score on placement exam. (4F,Sp,Su) ©

1060. Trigonometry. Trigonometric functions, equations, identities, and applications. Graphing calculator required. Prerequisite: Math 1010, or Math ACT score of at least 23, or satisfactory score on placement exam. (2F,Sp,Su)

QL 1100. Calculus Techniques. Techniques of elementary calculus, differentiation, integration, elementary optimization, and introduction to partial derivatives. Applications in business, social science, and natural resources. Graphing calculator required. Prerequisite: Math 1050. (3F,Sp,Su)

QL 1210. Calculus I. Analytic geometry, differential and integral calculus, transcedental functions, and applications. Graphing calculator required. Prerequisites: Math 1050 and 1060, or AP math score of at least 3 on Calculus AB test. (4F,Sp,Su)

QL 1220. Calculus II. Integration, infinite series, introduction to vectors, and applications. Graphing calculator required. Prerequisite: Math 1210, or AP score of at least 4 on calculus AB exam or at least 3 on calculus BC exam. (4F,Sp,Su)

QI 2020. Introduction to Logic and Geometry. Logic; introduction to algebraic geometry and Euclidean geometry. Math 2020 is a mathematics content course, not a methods course. Graphing calculator required. Prerequisite: Math 1050 or math ACT score of at least 25. (3F,Sp)

QI 2210. Multivariable Calculus. Vector calculus, multiple integration, partial derivatives, line and surface integrals. The theorems of Green, Gauss, and Stokes. Prerequisite: Math 1220 or AP calculus score of 5 on BC exam. (3F,Sp,Su)

QI 2250. Linear Algebra and Differential Equations. Linear systems, abstract vector spaces, matrices through eigenvalues and eigenvectors, solution of ode's, Laplace transforms, first order systems. Prerequisite: Math 1220 or AP calculus score of 5 on BC exam. (4F,Sp,Su)

2260. Internship and Cooperative Studies. Lower-division internship/cooperative work experience. (1-6F,Sp,Su) ®

QI 2270. Linear Algebra. Topics from linear algebra, including matrices, abstract vector spaces, linear independence, bases, eigenvalues, eigenvectors, orthogonality, least squares approximation, and linear transformations. Recommended for Math and Math Education majors. Prerequisite: Math 1220 or AP math score of 5 on calculus BC exam. (3F,Sp)

QI 2280. Ordinary Differential Equations. Techniques used in finding solutions of ordinary differential equations. Exact equations, linear equations, Laplace transforms, and first order systems. Recommended for Math and Math Education majors. Prerequisite: Math 2270. (3F,Sp)

2910. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-3F,Sp,Su) ®

3110. Modern Geometry. Euclidean and non-Euclidean geometry, with emphasis on historical significance of parallel postulate. Axiomatic development of geometry and theorems. Prerequisite: Math 1220. (3Sp)

3300. School Laboratory for Mathematics Teachers Level I. Provides preservice mathematics teachers with supervised experiences working with teachers and students in middle and secondary schools. Activities coordinated with other Level I professional education courses, including Math 4500 and ScEd 3100. Concurrent enrollment required in InsT 3000, ScEd 3100, 3200, and a special methods course. (1F,Sp)

3310. Discrete Mathematics. Logic and axiomatics, sets, functions, counting methods, recurrence relations, graph theory, Boolean algebra. Prerequisite: Math 1220. (2F,Sp)

4200. Foundations of Analysis. Fundamental concepts of analysis studied from a rigorous point of view. Rigorous development of the real number system and calculus. Emphasis on learning how to construct proofs. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3F,Sp)

****4230. Applied Mathematics in Biology.** Formulation, analysis, and experimental tests of mathematical models in biology. Combines mathematics, computing, experimental design, and statistical analysis while applying the scientific method to biological systems. Lectures, recitations, and a laboratory. Prerequisites: Biol 1220, 1230, 1240; Math 2250; or permission of instructor. Programming experience recommended. (3sp)

4250. Advanced Internship/Co-op. An internship/cooperative work experience which has been determined by the department to be at the 4000-level.
(1-6F,Sp,Su) ®

4300. School Laboratory for Mathematics Teachers Level II. Provides preservice mathematics teachers with supervised experiences working with teachers and students in middle and secondary schools. Activities coordinated with other Level II professional education courses, including Math 4500 and ScEd 4100. Concurrent enrollment required in SpEd 4000, ScEd 4100, 4200, and a special methods course. (1F,Sp)

4310. Introduction to Algebraic Structures. First course in theory of algebraic structures. Topics include elementary group and ring theory. Prerequisites: Math 2210, 2270, 2280; or Math 2210, 2250. (3F,Sp) ®

4400. History of Mathematics. Chronological parallel of math history with cilvilization, evolution of mathematical thought, historical foundations of numbers, computation, geometry, algebra, trigonometry, and calculus. Prerequisites: At least one of Math 4200 and 4310, and concurrent enrollment in the other. (3Sp)

4500. Methods of Secondary School Mathematics Teaching. A teaching methods course required of all prospective secondary school mathematics teachers. Prerequisites: Math 3110, and one of Math 4200 or 4300. (3F,Sp)

4620. Computer Aided Math for Secondary Math Teachers. Problem solving using symbolic manipulation software on computers. Topics include material introduced in Math 1210, 1220, 2210, 2250, 2270, and 2280. Includes instruction in the use of modern computerized devices in the classroom. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3F)

4630. Computer Aided Math for Scientists and Engineers. Problem solving for scientists and engineers, using symbolic manipulation software on computers. Undergraduate mathematical concepts are revisited and extended. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3Sp)

4910. Directed Reading and Conference. Registration requires prior arrangement with specific instructor. (1-3F,Sp,Su) ®

****5110. Differential Geometry.** Introduction to geometry of curves and surfaces in three dimensions, using graphic and symbolic software. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3Sp)

5210. Introduction to Analysis I. One and several variable calculus from an advanced point of view. Proofs of all main theorems in calculus. Prerequisite: Math 4200 or 5510. (3F)

5220. Introduction to Analysis II. Continuation of Math 5210. Rigorous development of multivariable advanced calculus. Prerequisite: Math 5210. (3Sp)

****5270. Complex Variables.** Basic theory and applications of complex variables for mathematics, physics, and engineering students. Topics include analytic functions, contour integration, and residue theorem conformal mappings. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3Sp)

****5310. Introduction to Modern Algebra.** Continuation of Math 4310. Topics include: Sylow theory for finite groups, factorization theory for commutative rings, and Galois theory. Prerequisite: Math 4310. (3Sp)

***5340. Theory of Linear Algebra.** Vector space theory, linear transformations and matrices, eigenvalues and eigenvectors, inner product spaces, orthogonality, canonical forms, and Hermitian matrices. Prerequisite: Math 4310. (3Sp)

5410. Methods of Applied Mathematics. Dimensional analysis, Buckingham Pi theorem, regular and singular perturbation theory, and introduction to calculus of variations. Prerequisites: Math 2210, 2250; or Math 2210, 2270, 2280. (3F)

5420. Partial Differential Equations. PDEs as models; minimum/maximum theorems; classical solution techniques, including separation of variables and eigenfunction expansions; method of characteristics; Fourier and Laplace transforms; and Green's functions. Prerequisite: Math 2250 or 2280. (3Sp)

5460. Introduction to the Theory and Application of Nonlinear Dynamical Systems. Qualitative behavior of nonlinear maps and ordinary differential equations. Stability of solutions, bifurcation theory, chaos, and applications. Prerequisite: Math 2250 or 2280. (3Sp)

5510. Introduction to Topology. Elementary point-set topology, topological spaces, separation axioms, metric spaces, compactness, connectedness, order topology, countability axioms, continuity, and homeomorphisms. Prerequisite: Math 2210 or equivalent. (3F)

****5570. Actuarial Math I.** Introduction to theory of risk and its application to

construction and analysis of models for insurance systems. Prerequisites: Math 5710, Stat 3000, and permission of instructor. (3F)

****5580. Actuarial Math II.** Continuation of Math 5570. Prerequisite: Math 5570. (3Sp)

5610. Computational Linear Algebra and Solution of Systems of Equations. Numerical solutions of systems of linear and nonlinear equations, methods for eigensystems, least squares problems, finding roots of functions and nonlinear systems, constrained and unconstrained optimization. Prerequisites: Math 2210, Math 2250 or 2270, and a high-level programming language. (3F)

***5620. Numerical Solutions of Differential Equations.** Numerical solution of differential equations, initial and boundary value problems, finite difference, finite element, and spectral methods (FFT) applied to ODEs and PDEs. Prerequisite: Math 2210, Math 2250 or 2270, Math 2280, and a high-level programming language. (3Sp)

5710. Introduction to Probability. Discrete and continuous probability, random variables, distribution and density functions, joint distributions, Bayes' theorem, moments, moment generating functions, inequalities, convergence in probability and distribution, and central limit theorem. Prerequisites: Math 2210, and Math 2250 or 2270. (3F,Sp)

5720. Introduction to Mathematical Statistics. Basic theory of point and interval estimation and hypothesis testing. Topics include: sufficiency and completeness; method-of-moments, best unbiased, maximum likelihood, Bayes', and empirical Bayes' estimators; Neyman-Pearson lemma; and likelihood ratio tests. Prerequisite: Math 5710. (3Sp)

***5760. Stochastic Processes.** Application of stochastic processes to engineering and science. Topics include Markov chains, Poisson processes, renewal theory, and Brownian motion. Prerequisite: Math 5710. (3Sp)

5810, 5820. Topics in Mathematics. Prerequisite: Permission of instructor. (1-3F,Sp,Su) (1-3F,Sp,Su) ®

5910. Directed Reading and Conference. Prerequisite: Prior arrangement with a specific instructor. (1-3F,Sp,Su) ®

5950H. Honors Senior Project. A senior project required for completion of the departmental honors program. Prerequisite: Permission of instructor. (1-4F,Sp,Su)

***6110, 6120. Differential Geometry.** Topics include manifolds, calculus on manifolds, tensor calculus and differential forms, Lie groups, Riemannian geometry, deRham's Theorem, and Hodge theory. Prerequisite: Math 5110 or 5220; Math 6110 must be completed prior to Math 6120. (3F) (3Sp)

6210, 6220. Real Analysis. Measure theory, abstract integration, differentiation, introduction to functional analysis, Hilbert and Banach spaces. Prerequisite: Math 5210; Math 6210 must be completed prior to 6220. (3F) (3Sp)

6250. Graduate Internship/Cooperative Studies. Graduate internship/cooperative work experience. (1-6F,Sp,Su) ®

***6270. Complex Variables.** Analytic functions, singular points, conformal maps, harmonic functions, analytic continuation, Residue theory. Prerequisite: Math 5210 or 5270. (3Sp)

***6310, 6320. Modern Algebra.** Algebraic structures, including vector spaces, groups, rings, algebras, and modules. Topics include: catagory theory, elementary commutative ring theory, and algebraic geometry. Prerequisite: Math 5310; Math 6310 must be completed prior to 6320. (3F) (3Sp)

****6340, 6350. Multilinear Algebra and Matrix Theory.** Permutation groups and representations, tensor spaces, symmetry classes of tensors, generalized matrix functions, matrices and graphs, and combinatorial matrix algebra. Prerequisite: Math 5340; Math 6340 must be completed prior to 6350. (3F) (3Sp)

***6410. Ordinary Differential Equations I.** Existence-uniqueness theory, linear equations and systems, nonlinear equations, and stability. Prerequisite: Math 5210. (3F)

***6420. Partial Differential Equations I.** Introduction to the theory of partial differential equations, including existence and uniqueness. Prerequisite: Math 5220 or 6410. (3Sp)

****6440. Ordinary Differential Equations II.** Asymptotic behavior, periodicity, boundary value problems, and perturbation methods. Prerequisite: Math 6410. (3Sp)

****6450. Partial Differential Equations II.** Advanced existence and uniqueness theorems, behavior of solutions, Sobolev spaces. Prerequisites: Math 6210; and Math 5420 or 6420. (3Sp)

6470. Advanced Asymptotic Methods. Theory of asymptotics and perturbations. Boundary layers for ordinary and partial differential equations. Free boundary problems, shocks, multiple-scale methods, and WKB methods. Prerequisite: Math 5420. (3Sp)

****6510, 6520. Topology.** Homotopy theory, fundamental groups, covering spaces, singular homology with applications to spheres and Euclidean spaces, CW complexes, cohomology ring, and Poincare duality. Prerequisites: Math 5310 and 5510; Math 6510 must be taken prior to 6520. (3F) (3Sp)

****6610. Numerical Analysis.** Linear and nonlinear equations, large scale problems, and eigenvalues. Prerequisites: Math 5210, 5610, or consent of instructor. (3F)

****6620. Numerical Analysis.** Numerical solution of ordinary and partial differential equations. Prerequisite: Math 6610 or consent of instructor. (3Sp)

***6640. Optimization.** Unconstrained problems, smooth function methods, linearly constrained problems, linear and quadratic programming, nonlinearly constrained methods, and practicalities. Prerequisite: Math 5220 or consent of instructor. (3sp)

****6750, 6760. Probability Thoery.** Probability spaces, random variables, distribution functions, expectations, independence, modes of convergence, limit theorems, and applications. Prerequisite: Math 5210; Math 6750 must be taken prior to 6760. (3F) (3Sp)

6810, 6820. Topics in Mathematics (Topic). Prerequisite: Consent of instructor. (3F) (3Sp) ®

6910. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-3F,Sp,Su) ®

6970. Thesis. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-2F,Sp,Su) ®

7110, 7120. Geometry (Topic). (3F) (3Sp) ®

7210, 7220. Analysis (Topic). (3F) (3Sp) ®

7310, 7320. Algebra (Topic). (3F) (3Sp) ®

7410, 7420. Differential Equations (Topic). (3F) (3Sp) ®

7510, 7520. Topology (Topic). (3F) (3Sp) ®

7610, 7620. Numerical Analysis (Topic). (3F) (3Sp) ®

7750, 7760. Probability (Topic). (3F) (3Sp) ®

7810, 7820. Topics in Mathematics (Topic). (3F) (3Sp) ®

7910. College Teaching Internship. (3F,Sp,Su) ®

7970. Dissertation Research. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-2F,Sp,Su) ®

Statistics Courses (Stat)

QL 1040. Introduction to Statistics. Descriptive and inferential statistical methods. Emphasis on conceptual understanding and statistical thinking. Examples presented from many different areas. Prerequisite: Math ACT score of at least 23, satisfactory score on placement exam for Math 1050, or Math 1010. (3F,Sp,Su)

QI 2000. Statistical Methods. Introduction to statistical concepts, graphical techniques, probability, distributions, estimation, one and two sample testing, chi-square tests, and simple linear regression. Prerequisite: Math 1050. (3F,Sp,Su)

2250. Internship and Cooperative Studies. Lower-division intership/cooperative work experience in statistics. (1-6F,Sp,Su)

QL 2300. Business Statistics. Descriptive and inferential statistics, probability, sampling, estimation, tests of hypotheses, linear regression and correlation, chi-square tests, analysis of variance, and multiple regression. Prerequisite: Math 1050. (4F,Sp,Su)

2950. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-3F,Sp,Su) ®

QI 3000. Statistics for Scientists. Introduction to statistical concepts, graphical techniques, discrete and continuous distributions, parameter estimation, hypothesis testing, and chi-square tests. Prerequisites: Math 1100 or 1210. (3F,Sp)

4250. Advanced Internship/Co-op. Advanced educational work experience in statistics. Prerequisite: Approval of instructor. (1-6F,Sp,Su) ®

4910. SPSS Shortcourse. Access to and use of the SPSS statistical software package. (1F,Sp,Su)

4920. SAS Shortcourse. Access to and use of the SAS statistical analysis program. (1F,Sp)

4950. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-3F,Sp,Su) ®

QI 5100. Linear Regression and Time Series. Methods for prediction and hypothesis testing in multiple linear regression models, including analysis of variance and covariance, logistic regression, introduction to time series, and signal processing. Prerequisite: Stat 2000 or 3000. (3Sp)

5110. Theory of Linear Models. Theory and methods of correlation, regression, and least square analysis of experimental data. Prerequisites: Math 2210, 2250, or Math 2210, 2270; and Stat 3000. (3F)

5120. Categorical Data Analysis. Analysis of categorical data, contingency tables, goodness of fit, random sampling, log-linear and logistic regression models, sampling for proportions, and stratified and cluster sampling. Prerequisite: Stat 5100. (3F)

5200. Design of Experiments. Design, analysis, and interpretation of experiments, split plots, incomplete blocks, confounding, fractional factorials, nested designs, two- and three-way analysis of variance, covariance, and multiple regression. Prerequisite: Stat 2000 or 3000. (3Sp)

QI 5300. Statistical Process Control. Techniques and applications of statistics in modern management of industrial processes. Control charts, acceptance sampling, design of industrial experiments, and analysis of process failures. Prerequisite: Stat 2000 or 3000. (3Sp)

5600. Applied Multivariate Statistics. Introduction to multivariate statistical procedures for data analysis. Topics include MANOVA, principal component analysis, factor analysis, clustering, and classification. Prerequisite: Stat 5100. (3F)

5810, 5820. Topics in Statistics. Prerequisite: Consent of instructor.
(1-3F) (1-3Sp) ®

5890. Problem Solving in Statistics. Capstone course for Statistics majors, applying course material covered in the undergraduate major. Prerequisite: Permission of instructor. (3Sp)

5940. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-3F,Sp,Su) ®

5950H. Senior Honors Project. A senior project, required for completion of the departmental honors program and developed under the direction of a departmental faculty member. Prerequisite: Permission of instructor. (1-4F,Sp,Su)

5970. Seminar. Review of current literature and developments in the field of statistics. (1-3F,Sp) ®

***6120. Generalized Linear Models.** Theory of generalized linear models and application to categorical data, and to regression-like and ANOVA-like data that do not meet the usual assumptions. Topics include link functions, error structures, deviance, quasi-likelihood estimation, and diagnostics. Prerequisites: Math 5720, Stat 5110. (3Sp)

****6180. Time Series.** The domain and frequency domain time series analysis, including Box-Jenkins methods, spectral analysis and filtering, introduction to state space methodology. Prerequisites: Stat 5100, Math 5720. (3Sp)

***6200. Analysis of Unbalanced Data and Complex Experimental Designs.** Contrasts; Type I, II, III, IV contrasts; sums of squares; and resulting tests. Random and mixed effects models for complex designs, such as split-plot, repeated measures, and hierarchical (nested) designs; expected mean square algorithm; and approximate F-tests. Prerequisite: Stat 5200. (3F)

6250. Graduate Internship/Co-op. Educational work experience at the graduate level. Prerequisite: Permission of instructor. (1-8) ®

****6510. Resampling Methods.** Covers theory and applications of computer intensive resampling methods: Bootstrap, Cross-validation, and Subsampling. Applications include hypothesis testing, confidence intervals, regression, time series, multivariate analysis, and nonparametric statistics. Prerequisites: Math 5710, concurrent enrollment in Math 5720. (3F)

****6520. Nonparametric Density Estimation and Smoothing.** Nonparametric density estimation and smoothing are generalizations of classical techniques that do not require such stringent distributional and functional form assumptions. This course covers theory, application, and implementation of histograms, frequency polygons, kernel-based methods, and spline-based methods. Prerequisite: Math 5720. (3Sp)

***6550. Statistical Computing.** Survey of algorithms and tools for modern statistical computing. Topics include simulation design and implementation, algorithms for linear regression and subset selection, smoothing algorithms, fast fourier transform, EM algorithm, numerical methods for maximum likelihood estimation, and neural networks. Prerequisites: Stat 5110, Math 5720, and knowledge of a programming language. (3F)

***6560. Graphical Methods.** Statistical graphics and scientific visualization of one, two, and higher dimensional data. Well-chosen and designed graphics are vital in

exploratory data analysis, model diagnostics, and data presentation. Includes specific methods and general principles, such as effective use of color and motion. Prerequisites: Math 2210, Stat 3000, and programming experience. (3Sp)

****6600. Multivariate Analysis.** Statistical methods for analyzing multivariate data and the theory behind them. Topics include multivariate normal distribution and multivariate distributions derived from it, multivariate t-tests, regression, ANOVA, principal components and factor analysis, multidimensional scaling, classification, and cluster analysis. Prerequisites: Math 5720 and concurrent enrollment in Stat 5110. (3F)

6710. Mathematical Statistics I. Modes of convergence of random variables, laws of large numbers, characteristic functions, and the central limit theorem. Prerequisite: Math 5720. (3F)

6720. Mathematical Statistics II. Consistency, loss functions, risk, and notions of optimality of estimations. Hypothesis testing and confidence regions. Large sample theory, notions of robustness. Prerequisite: Stat 6710. (3Sp)

6810. Topics in Statistics (Topic). Prerequisite: Permission of instructor. (3F) ®

6820. Topics in Statistics (Topic). Prerequisite: Permission of instructor. (3Sp) ®

6890. Practical Statistical Consulting. Introduction to statistical consulting for graduate students, for faculty in other research departments, and for business, industry, and government. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

6910. Seminar in Statistics. Review of current literature and developments in statistics. Prerequisite: Permission of instructor. (1-3F,Sp) ®

6950. Directed Reading and Conference. Prerequisite: Prior arrangement with specific instructor. (1-4F,Sp,Su) ®

6970. Thesis and Research. Outlining and conducting research in statistics. Thesis preparation. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7110, 7120. Linear Models (Topic). (3F) (3Sp) ®

7180, 7190. Time Series Analysis (Topic). (3F) (3Sp) ®

7210, 7220. Experimental Design (Topic). (3F) (3Sp) ®

7310, 7320. Business and Industrial Statistics (Topic). (3F) (3Sp) ®

7510, 7520. Nonparametric Statistics (Topic). (3F) (3Sp) ®

7550, 7560. Computational and Graphical Statistics (Topic). (3F) (3Sp) ®

7610, 7620. Multivariate Statistics (Topic). (3F) (3Sp) ®

7710, 7720. Mathematical Statistics (Topic). (3F) (3Sp) ®

7730, 7740. Bayesian Statistics and Decision Theory (Topic). (3F) (3Sp) ®

7810, 7820. Topics in Statistics (Topic). (1-3F) (1-3Sp) ®

7970. Dissertation Research. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-2F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Mechanical and Aerospace Engineering

College of Engineering

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manufacturing, life-cycle engineering; *Christine E. Hailey*, aerodynamics, fluid/thermal

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Mechanical Engineering

Graduate specializations: *MS, PhD*– Aerospace Engineering, Manufacturing Engineering, Mechanical Engineering

Undergraduate Programs

Objectives

The Department of Mechanical and Aerospace Engineering (MAE) offers the Mechanical Engineering Program, the Manufacturing Engineering Program, and the Aerospace Engineering Option.

The mission of the Mechanical and Aerospace Engineering Department is to produce superior graduates who are qualified and prepared for challenging and rewarding professional careers in mechanical engineering, manufacturing engineering, or aerospace engineering. A degree in Mechanical Engineering also provides a solid foundation for entry into other fields, such as business, law, or medicine.

The **Mechanical Engineering** Program forms the nucleus for all three areas of emphasis in the department. The manufacturing engineering program and the aerospace engineering option are built on a strong foundation of mechanical engineering fundamentals. These fundamentals are centered on the study of energy, including its conversion to more useful forms, its transmission to needed locations, and its utilization; and on the study of mechanical systems, their structures, and their motion. The Mechanical Engineering Program provides the broadest background of any discipline in the field of engineering. Mechanical Engineering graduates are prepared to pursue careers in such widely diverse industries as aerospace, agricultural equipment, automotive, biotechnical, chemical processing, composite materials, computer equipment, defense, electrical utilities, food processing, industrial equipment, manufacturing, materials processing, nuclear, petroleum, robotics, and solar energy. For additional details on the Mechanical Engineering Program, see the web site at:
http://www.mae.usu.edu/undergrad/mechanical/.

The **Aerospace Engineering** Option serves to focus mechanical engineering fundamentals on the mechanics and dynamics of both flight within the atmosphere and space flight. Included within its scope are studies in aerodynamics, aircraft flight dynamics and control, aircraft design, spacecraft orbital mechanics, spacecraft attitude motion and control, and space systems design. Graduates who complete the Aerospace Engineering Option are prepared to pursue careers in aircraft design and development, aircraft flight testing, spacecraft and space systems design, and spacecraft trajectory design and analysis. Graduates who choose the Aerospace Engineering Option receive a BS degree in Mechanical Engineering with an aerospace emphasis. As fully qualified Mechanical Engineers, these graduates are also well prepared to pursue careers in all of the same industries listed above under Mechanical Engineering. For additional details on the Aerospace Engineering Option, see the web site at: **http://www.mae.usu.edu/undergrad/aerospace/**.

The **Manufacturing Engineering** Program serves to focus mechanical engineering fundamentals on the study of manufacturing processes and materials, process and product engineering, productivity and quality, the design of manufacturing systems, and design for manufacturability. Areas of emphasis include automated processes and computer aided manufacturing. Graduates who complete the Manufacturing Engineering option are prepared to pursue careers in any industry that manufactures a product. Examples of industries which require manufacturing engineers are aircraft, automotive, chemical, electronics, defense, food processing, heavy equipment, machine tools, and petroleum. For details on the Manufacturing Engineering Program, see the web site at:
http://www.mae.usu.edu/undergrad/manufacturing/.

With further training, many Mechanical and Aerospace Engineering graduates seek interdisciplinary careers in areas such as environmental engineering, consulting, law, or business management. In addition, students who are preparing to apply for admission to medical school will find that Mechanical Engineering provides an excellent foundation for the increasingly technology-oriented field of medicine.

The overall curricular objective of the MAE Department is to provide an educational experience integrating the fundamentals of mathematics, basic science, computer science, and engineering science with appropriate laboratory and engineering design activities to develop competent graduates who are able to (1) identify and characterize practical problems within their areas of specialization and (2) apply their skills to the design and development of mechanical systems providing solutions to those problems. The curriculum is also designed to provide a background in the humanities and social sciences, in order to equip graduates with an understanding of the societal background within which they will pursue their profession.

The first two years of the MAE curriculum are structured to concentrate on the fundamentals of mathematics, physics, computer science, and basic engineering science. During the second two years, students apply these fundamentals to more concentrated courses in the essentials of mechanical, aerospace, and/or manufacturing engineering. Laboratory activities and computer usage are integrated throughout the curriculum to give students opportunities for hands-on exposure to modern computer hardware and software, as well as other modern hardware and laboratory facilities. Engineering design activities begin during the first two years and progress in depth as the student's proficiency increases. The engineering design experience culminates in a major senior design course, integrating the engineering coursework into a focused, realistic design project. Some examples of past and current MAE senior design projects may be found on the undergraduate web site at: **http://www.mae.usu.edu/undergrad/snrdesign/**.

Both the Mechanical Engineering and the Manufacturing Engineering programs are accredited separately by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The

Aerospace Engineering Option is accredited as part of the Mechanical Engineering Program.

Admission and Graduation Requirements

Freshman and transfer students must satisfy the admission policies and entrance requirements of both the University and the College of Engineering. Each new student will be assigned an adviser, who will help plan an educational program fulfilling the student's professional goals. Placement of incoming students will depend on high school and/or prior college coursework. Those who complete a portion of the University Studies (General Education) requirements by examination (CLEP) and/or by advanced placement (AP) credit may complete the requirements for a Bachelor of Science degree in less than four years. For current details on admission requirements and advanced placement, see the web site at:
http://www.mae.usu.edu/undergrad/admission/.

Curriculum. At the beginning of each school year, each student should obtain a detailed, four-year requirement sheet. This sheet, which lists semester requirements for each of the three curricula (mechanical, manufacturing, and aerospace), may be obtained from the departmental office. All students in the department follow the preprofessional engineering curriculum for the freshman and sophomore years. Prior to the junior year, the student must apply for admission to the professional program and, in consultation with the faculty adviser, select an area of emphasis. Students who are unable to take courses during the semester indicated on the curriculum requirement sheet may develop alternative schedules, consistent with prerequisites and the timing of course offerings. For current details on the preprofessional curriculum and the professional programs, see the appropriate web pages at: **http://www.mae.usu.edu/undergrad/**.

GPA Requirement. A 2.3 GPA in all technical courses is the minimum standard which preprofessional students must attain in order to be considered for admission to any MAE professional program. A 2.0 overall GPA is required to be considered for graduation from any undergraduate program in the Mechanical and Aerospace Engineering Department.

Course Requirements. The specific course requirements for the MAE preprofessional program and the MAE professional programs are quite extensive and may occasionally change. For these reasons, the complete requirements are not listed here. For current details on all requirements for the preprofessional program, as well as the professional programs in mechanical, aerospace, and manufacturing, see the web pages at:
http://www.mae.usu.edu/undergrad/requirements.

A **passing grade on the Fundamentals of Engineering Exam**, the first step in becoming a licensed professional engineer, is required for graduation. Past experience has shown that the USU Mechanical and Aerospace Engineering students are well-prepared for this locally administered, national exam.

For additional information on academic requirements, see the College of Engineering and the Undergraduate Graduation Requirements sections of this catalog or refer to the College of Engineering web pages at: **http://www.engineering.usu.edu/**.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available to undergraduate students through the University. In addition, the MAE department employs undergraduates to assist in engineering research and development. Aerodynamics, design of instrumentation and payloads for the upper atmosphere and space, buried structures, and manufacturing processes and controls are some of the research programs that involve undergraduate students. Cooperative education and industrial employment opportunities for students are coordinated by the University Placement Office. For details on currently available undergraduate support, see the web site at: **http://www.mae.usu.edu/undergrad/support/**.

Graduate Programs

Admission Requirements

All students interested in pursuing graduate studies at Utah State University must complete and return an *Application for Admission* to the School of Graduate Studies. In addition to the general graduate admission requirements listed on pages 60-61, the department requires all graduate applicants to have a bachelor's degree from an accredited institution in Mechanical Engineering, Aerospace Engineering, Manufacturing Engineering, or a closely related engineering discipline. A minimum GPA of 3.0 for MS applicants and 3.3 for PhD applicants is required for the last 60 semester or 90 quarter credits earned. All MAE graduate students are expected to be well-acquainted with either the FORTRAN or C programming language. Those students who do not have a BS degree in an appropriate engineering discipline may be admitted with nonmatriculated status and required to complete some remedial requirements. For a detailed list of these requirements, see the web site at:
http://www.mae.usu.edu/graduate/admission/.

Applicants are also required to submit evidence of potential graduate-level success through GRE scores in several categories. MS applicants are required to submit scores in the verbal, quantitative, and analytical categories. In addition to these three categories, PhD applicants are required to submit a score in the advanced engineering category by the end of their first year.

Further details concerning graduate admission requirements and prerequisites can be obtained by contacting the head of the department or by referring to the appropriate USU web pages at: **http://www.mae.usu.edu/graduate/**.

Specializations

The Department of Mechanical and Aerospace Engineering offers both MS and PhD degrees in Mechanical Engineering, with specializations in Aerospace Engineering, Manufacturing Engineering, and Mechanical Engineering.

Aerospace Engineering is the branch of engineering concerned with atmospheric and space flight. Included are such disciplines as computational fluid dynamics, experimental fluid mechanics, aerodynamics, aircraft flight dynamics, aircraft design, spacecraft orbital mechanics, spacecraft attitude motion and control, aircraft and spacecraft propulsion systems, space

system design, thermal management of space deployed systems, and the space environment. Mechanical Engineering graduates choosing the aerospace specialization may pursue careers in such areas as aircraft design and development, aircraft flight testing, spacecraft and space systems design, and spacecraft trajectory design and analysis, as well as the broader, traditional mechanical engineering fields.

Manufacturing Engineering is the branch of engineering that involves the study of manufacturing processes and materials, product and process engineering, the design of manufacturing systems, productivity and quality, and product design for manufacturability. Areas of emphasis include flexible processes, automation, computer aided manufacturing, computer integrated manufacturing systems, and product/process integration. Mechanical Engineering graduates who select the manufacturing engineering specialization are prepared to pursue careers in any industry that manufactures a product. Examples of industries that require manufacturing engineers are aircraft, automotive, chemical, electronics, defense, food processing, and petroleum.

Mechanical Engineering is the branch of engineering that is primarily concerned with energy, including its conservation, its conversion to more useful forms, its transmission to needed locations, and its utilization. Areas of emphasis include solid mechanics, thermal/fluid science, dynamics, and control. The **solid mechanics** emphasis is concerned with the mechanics of displacement and stress analysis combined with material science for selection of an optimum design. Students learn to use the finite element method as well as classical methods for the determination of stresses, strains, and displacements. Included are studies of elasticity, plasticity, and failure in traditional metals and high-tech composite materials. The **thermal/fluid science** emphasis is concerned with the transport of mass, momentum, and energy in solids, liquids, and gasses. Included within its scope are the fundamental studies of thermodynamics, heat transfer, and fluid mechanics. The **dynamics and control** emphasis is concerned with describing and controlling the motion of mechanical systems. Included within its scope are the fundamental studies of dynamics, kinematics, vibrations, control theory, hydraulics and pneumatics, electromechanical systems, and machine design. Graduates who select the mechanical engineering specialization are prepared to pursue careers in such widely diverse disciplines as aerospace, automotive, building, chemical, defense, electronics, environmental engineering, food processing, heating and air conditioning, heavy equipment, machine tools, manufacturing, nuclear, petroleum, public utilities, and solar energy.

Degree Programs

The **Plan A MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 12 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and 9 credits selected from any one of five declared areas of emphasis. A minimum of 30 credits is required beyond the BS, including a 6-credit thesis (MAE 6970). The thesis must meet School of Graduate Studies requirements. A paper with the student as author or coauthor, submitted for publication in a refereed journal, is also required.

The **Plan B MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 15 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and 12 credits selected from any one of five declared areas of emphasis. A minimum of 30 credits is required beyond the BS, including a 3-credit thesis (MAE 6970). The thesis must meet School of Graduate Studies requirements.

The **Plan C MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 18 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and either 12 credits selected from any one of five declared areas of emphasis, or 15 credits selected from any two of the areas. A minimum of 33 credits is required beyond the BS, which may not include a thesis (MAE 6970), but may include up to 3 credits of Design Project (MAE 6950). MAE 6950 requires a report written to thesis standards.

The **PhD Degree** requires 12 credits of graduate-level coursework in Mechanical Engineering fundamentals; 24 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, 6990, 7930, 7970, and 7990; a minimum of 6 credits of 5000-level (or above) coursework in approved mathematics; and 18 credits selected from any one of five declared areas of emphasis. A minimum of 90 credits is required beyond the BS, including a dissertation (MAE 7970). The dissertation must meet School of Graduate Studies requirements and be at least 24 credits, but no more than 30 credits. A paper with the student as author or coauthor, submitted for publication in a refereed journal, is also required.

GPA Requirement. A 3.0 GPA is the minimum acceptable for graduation with an MS or PhD degree from Utah State University.

Course Requirements. The specific course requirements for the MS and PhD degrees offered through the department may occasionally change. For this reason, prospective students are advised to seek current details concerning graduate degree requirements and program coursework by contacting the department head, sending an internet e-mail request to jpsmith@mae.usu.edu., or referring to the web pages at: **http://www.mae.usu.edu/graduate/requirements**.

Research

The Department of Mechanical and Aerospace Engineering is conducting research in all of the areas of specialization listed above. Departmental research projects are funded by both government agencies and private industry. Current research topics include analytical and experimental structural dynamics, computational and experimental fluid dynamics, aerodynamics, plastics and composite materials, numerical modeling and design of composite structures, buried structures, thermodynamics, heat transfer, cryogenics, intelligent control systems, manufacturing automation, spacecraft control, design and analysis of space systems, orbital mechanics, remote sensing, robotics, life-cycle engineering, and design theory and methodology. For additional details on research currently being conducted in the department, see the web site at: **http://www.mae.usu.edu/research/**.

Financial Assistance

A number of teaching and research assistantships are available to graduate students through the department, and are awarded on a competitive basis each year. In addition, scholarships covering the

nonresident portion of tuition are available each semester, on a competitive basis, to nonresident students who hold a graduate assistantship paying at least $185 per month. Students interested in working part time as teaching or research assistants should apply to the department by March 31 for the coming academic year.

Acceptance to pursue graduate studies in the Department of Mechanical and Aerospace Engineering does not imply a commitment to any type of financial aid. All awards for financial aid are made on a competitive basis after applicants are admitted to graduate school. All students who receive any type of financial support from the University or who are supplied University space for study or research must carry a minimum of nine credits each semester while receiving such support.

For details on graduate student support currently available through the department, see the web site at:
http://www.mae.usu.edu/graduate/support/.

Mechanical and Aerospace Engineering Courses (MAE)

1200. Engineering Graphics. Technical drawing, descriptive geometry, and computer graphics. Computer graphics used to teach drafting, dimensioning and tolerancing, and geometric design. Prerequisite: Math 1060. (2F,Sp)

2060. Material Science. Study of atomic and microscopic structures of metals, polymers, ceramics, and composite materials, and how these structures affect material properties. Prerequisite: Chem 1210. (3F)

2210. Engineering Numerical Methods II. Numerical solution techniques for solving ordinary and partial differential equations, emphasizing practical applications, grid generation, computer graphics, and software development using FORTRAN. Prerequisite: Engr 2200. (3F,Sp)

2250. Cooperative Practice. Planned work experience in industry. Detailed program must have prior approval. Written report required. (3F,Sp,Su)

2400. Thermodynamics I. First and second laws of thermodynamics; analysis of open and closed systems; equations of state; power and refrigeration cycles; and problem solving methodology. Prerequisites: Math 1220; Math 2210 (taken concurrently). (3F,Sp,Su)

3040. Mechanics of Solids. Stress, strain, and deflection due to flexure and shear. Combined stresses, instability, nonsymmetric bending, torsion, and energy methods. Prerequisite: Engr 2040. (3F)

3320. Advanced Dynamics. Particle and rigid body dynamics. Work and kinetic energy, conservation of energy, impulse-momentum, conservation of linear and angular momentum. Kinematics and kinetics in 2-D and 3-D. Newtonian and Lagrangian Mechanics. Prerequisite: Engr 2020. Corequisite: MAE 2210. (3F)

3340. Instrumentation and Measurements. Principles and application of mechanical instrumentation and experimentation. Sensing elements, signal conditioning, data acquisition, statistical analysis of data, and instrumentation system design. Prerequisites: Engr 2040 and ECE 2200. (3Sp)

3400. Thermodynamics II. Second law analysis, power and refrigeration cycles, property relations, gas mixtures, psychrometrics, chemical reactions, chemical equilibrium, introduction to heat transfer, steady state and transient conduction. Prerequisite: MAE 2400. Corequisite: Engr 2200. (3F)

3420. Fluid Dynamics. Application of fluid dynamic theory to inviscid and viscous, incompressible and compressible, and external and internal fluid flows, with emphasis on laminar and turbulent boundary layers. Must be taken concurrently with Engr 2200. Prerequisites: Engr 2020, MAE 2400. (3F)

QI 3440. Heat and Mass Transfer. Introduction to convection, external flow, internal flow, free convection, boiling and condensation, heat exchangers, radiation and diffusion mass transfer. Includes design project. Prerequisites: MAE 3400 and 3420. Corequisite: MAE 2210. (3Sp)

3600. Manufacturing Processes. Introduction to manufacturing processes and CAD/CAM. Material forming, machining, finishing, and joining. Integration of manufacturing and CAD. Prerequisites: Engr 2040, MAE 2060; MAE 3440 (may be taken concurrently). (3Sp)

3800. Design I. First course in senior design sequence. Design process, teaming skills, engineering economics, project selection and management, proposal writing, technical writing, and technical presentations. Prerequisite: Engr 2040. (1Sp)

4300. Machine Design. Computer-aided design and synthesis of mechanisms, mechanical linkages, cams, fasteners, welds, gears, bearings, power transmission components, and lubrication. Component failure analysis based on metal fatigue related to dynamic loading. Prerequisite: MAE 3040. (4Sp)

4400. Fluids/Thermal Laboratory. Laboratory experiences in observation and measurement of fundamental fluid and thermal phenomena. Prerequisites: MAE 3340, 3440. (1F)

CI 4800. Design II. Senior design project, including a technical presentation and a critical design review. Prerequisites: MAE 3440, 3800, 4300. (3F)

CI 4810. Design III. Senior design project, including final report and design defense. Prerequisite: MAE 4800. (3Sp)

5020. Finite Element Methods in Solid Mechanics I. Introduction to finite element methods and their application to the analysis and design of mechanical engineering systems. Prerequisite: MAE 3040. (3F)

5060. Mechanics of Composite Materials I. Stress-strain relations for nonisotropic composites, such as fiber-reinforced plastic laminates, properties and their uses, strength and life determination, and methods for design using composite materials. Prerequisite: MAE 3040 or CEE 3010. (3Sp)

5300. Vibrations. Vibration of single and multiple degree of freedom, and discrete mass systems. Natural frequencies and mode shapes for free, damped, and undamped sytems. Forcing functions and transient responses. Matrix methods, numerical solution, and random vibrations. Applications and design. Prerequisite: MAE 3320. (3Sp)

5310. Dynamic Systems and Controls. Modeling and dynamic response of mechanical, electro-mechanical, hydraulic, and pneumatic systems. Classical feedback control systems with emphasis on stability analysis and design fundamentals. Must be taken concurrently with MAE 3340. (3Sp)

5400. Heating and Air Conditioning. Air conditioning and heating, solar utilization, thermal environmental control, computational methods, and design project. Prerequisites: MAE 3400, 3420. (3F)

5420. Compressible Fluid Flow. Application of conservation of mass, momentum, and energy to the design and analysis of compressible fluid systems. Prerequisites: MAE 3400, 3420. (3Sp)

5500. Aerodynamics. Fundamentals of incompressible, inviscid flow; aerodynamic forces and moments; airfoil characteristics; incompressible flow around two-dimensional airfoils and finite wings; three-dimensional incompressible flow; and introduction to aircraft performance. Prerequisite: MAE 3420. (3Sp)

5510. Dynamics of Atmospheric Flight. Aircraft equations of motion; aerodynamic forces and moments; aircraft stability and control in roll, pitch, and yaw; aircraft

motion with six degrees of freedom; aircraft performance and design; and design project. Prerequisite: MAE 5500. (3F)

5520. Dynamics of Space Flight. Classical astrodynamics, including orbital mechanics, orbit determination, orbital maneuvers, earth-orbiting and interplanetary trajectories; spacecraft attitude motion and control, gyroscopic instruments; introduction to spacecraft propulsion. Prerequisite: Engr 2020. (3F)

5600. Manufacturing Process Planning and Statistical Quality Control. Surveys modern manufacturing strategies, techniques, and technologies, emphasizing statistical quality control methods and economic production. Must be taken concurrently with MAE 3600. (3F)

5610. Hydraulics and Pneumatics. Hydraulic and pneumatic circuit theory, components, and systems analysis and design. Efficiency and performance evaluation, based on steady and transient flow principles and force and energy transfer concepts. Introduction to electrohydraulic control systems. Prerequisite: MAE 3420. (3Sp)

5620. Manufacturing Automation. Principles of automation technology as applied to manufacturing systems. Topics include motion control, PLC, robotics, CNC, and system integration. Prerequisites: MAE 3600, 5310. (3F)

5640. Design for Manufacturability. Product design for economic production. Manufacturing processes (especially primary processes), associated tooling cost and design, and resultant product design requirments. Prerequisites: MAE 3040, 3600, 3800. (3Sp)

5680. Manufacturing Process Engineering. Setting of manufacturing process parameters and their effect on process cost and product quality. Prerequisites: MAE 3400, 3420; MAE 5640 (may be taken concurrently). (3F)

5900. Cooperative Practice. Planned work experience in industry. Detailed program must have prior approval. Written report required. Student must be in professional program. (3F,Sp,Su)

5930. Special Problems. Formulation and solution of practical or theoretical problems. Prerequisite: Permission of department head. (3F,Sp,Su)

*****6010. Finite Element Methods in Solid Mechanics II.** Advanced theory and applications of finite element methods to both static and dynamic solid mechanics problems. Prerequisite: MAE 5020. (3Sp)

6040. Continuum Mechanics and Elasticity. Mechanics of continuous media; tensors, stress, strain, deformation, rate equations, and constitutive equations. Plane stress, plane strain, torsion, and bending theories, as well as problem solutions, investigated for linear elastic materials. Prerequsite: MAE 3040 or CEE 3010. (3F)

*****6070. Mechanics of Composite Materials II.** Second course in composite materials. Stress-strain states of laminated composite structures, including interlaminar stresses, failure criteria, and hygrothermal stresses. Prerequisite: MAE 5060. (3Sp)

6130. Structural Dynamics and Seismic Design. Development and solutions for equations of motion for single- and multi-degree of freedom systems. Dynamic analysis by Modal Superposition and Response Spectra. Design of structures for seismically active areas. (3Sp)

*****6180. Dynamics and Vibrations.** Fundamentals of two-dimensional and three-dimensional rigid body dynamics, including Newtonian, Lagrangian, and Leavit Energy Methods. Equations of motion, mode shapes, and natural frequencies for continuous media and multi degree-of-freedom systems. Prerequisite: MAE 5300 or CEE 6130. (3F)

6320. Control Theory I. Methods of optimization, estimation, and control of linear deterministic and stochastic systems. Linear quadratic regulator design, Kalman filters, dynamic programming applications of calculus of variations, and separation theorems. Prerequisite: ECE 5310. (3F)

6330. Control Theory II. Methods of nonlinear and adaptive control system design and analysis. Includes qualitative and quantitative theories, graphical methods, frequency domain methods, sliding surface design, linear parameter estimation methods, and direct and indirect adaptive control techniques. Prerequisite: ECE 6320. (3Sp)

*****6340. Spacecraft Attitude Control.** Spacecraft attitude dynamics and controls. Spin stabilized, three axis, and dual spin modes. Attitude determination techniques. Prerequisite: ECE 5310. (3F)

6410. Fluid Dynamics. Basic laws of fluid motion, Navier Stokes equations, kinematics of the flow field, fundamental exact solutions of viscous flow, and elements of turbulence. Prerequisite: MAE 3420 or CEE 3500. (3F)

*****6420. Experimental Methods in Fluid Mechanics.** Explores process and techniques involved in acquisition, analysis, and presentation of experimental data, with particular emphasis on aerodynamic applications. Topics include digital signal processing, statistics, uncertainty analysis, hot wire anemometry, and wind tunnel testing. Prerequisite: MAE 3420. (3F)

*****6430. Boundary Layer Theory.** Topics include derivation of the boundary layer equations; exact, approximate, and numerical solution techniques; quasi-cylindrical swirling flows; boundary layers in compressible flow; separation; nonsteady boundary layers; stability and transition; and turbulent boundary layers. Prerequisite: MAE 6410. (3Sp)

*****6440. Computational Fluid Dynamics.** Application of finite-volume methods for solving incompressible and compressible Navier-Stokes equations. Turbulence modeling and grid generation techniques. Prerequisite: MAE 6410. (3Sp)

*****6450. Thermodynamics.** Topics in classical and statistical thermodynamics, including distribution functions, free molecular flow, electron and photon gas modeling, derived properties of solids, and thermodynamic applications in areas of current research interest. Prerequisite: MAE 3400. (3F)

*****6460. Conduction Heat Transfer.** Integral, differential, and numerical methods for solving engineering problems associated with the diffusion of heat in a rigid solid. Prerequisite: MAE 3440. (3Sp)

*****6470. Convection Heat Transfer.** Integral, differential, and numerical methods for solving engineering problems associated with transfer of heat in a viscous fluid. Prerequisites: MAE 3420, 3440. (3Sp)

*****6480. Radiation Heat Transfer.** Radiation theory and applications. Includes utilization of computer software. Prerequisite: MAE 3440. (3F)

*****6490. Turbulence.** Fundamentals of turbulent fluid flow, with emphasis on providing student with sufficient physical and mathematical background to critically evaluate current literature and make original research contributions. Topics include stochastic tools, the governing equations, transition to turbulence, isotropic turbulence, measurement techniques, and free and wall bounded turbulent shear flows. Prerequisite: MAE 6410 or instructor's consent. (3F)

6530. Propulsion Systems. Fundamentals of turbine and rocket propulsion, including nozzle theory and thermodynamic relations, combustion processes, and flight performance. Rocket propulsion topics, including solid, liquid, and hybrid rocket engines; and advanced engine concepts. Turbine engine propulsion systems, including turbojets, turbofans, afterburners, and advanced unducted fan concepts. Prerequisite: MAE 5420. (3Sp)

*****6540. Astrodynamics.** Advanced topics in astrodynamics to include: general and special perturbations, universal variable, methods of orbit determination, Lambert's theorem, the restricted three-body problem, and space mission planning. Prerequisite: MAE 5520. (3Sp)

***6570. Potential Fluid Flow.** Application of the principles and methods of classical hydrodynamics to the solution of problems. Closed form solution to invisual fluid

flows obtained using complex variables and conformal mappings. Prerequisite: CEE 3510 or MAE 3420. (2F)

*****6800. Advanced Machine Design.** Advanced topics in fluid film and boundary lubrication. Dynamics and vibration consideration in design of machine systems and fatigue failure theories. Prerequisite: MAE 4800. (3Sp)

6930. Special Problems. Independent or group study of engineering problems not covered in regular course offerings. (1-3F,Sp,Su) ®

6950. Design Project. Individual projects involving the design, development, and/or testing of components, devices, or systems. Formal report required. (3F,Sp,Su)

6970. Thesis Research. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

*****7040. Elasticity.** Energy theorems, variational techniques, complex variable solutions, and three-dimensional solutions for linear elastic materials. Prerequisite: MAE 6040 or instructor's consent. (3Sp)

*****7050. Plasticity.** Analysis of stresses, deformation, and collapse in devices constructed of plastic material. Prerequisite: MAE 6040 or CEE 6080 or instructor's consent. (3Sp)

7080. Plate and Shell Theory. Introduction to plate and shell theories through anology to beams and arches. Development of bending and buckling theories of plates and shells through elasticity theory. Analysis of various plates and shells by classical and numerical methods. Computer applications. Prerequisite: CEE 3010. (3F)

*****7350. Advanced Control Theory I.** Intelligent control strategies, including neural network, fuzzy logic, associated memory networks, and rule-based control systems. Prerequisite: ECE/MAE 6320 or instructor approval. (3F)

7360. Advanced Control Theory II. Advanced methods of nonlinear systems analysis, including: H-infinity methods, QFT methods, extended Kalman state estimators, nonlinear separation theorem, and bounded input-bounded output methods. (3Sp)

*****7380. Avanced Dynamics and Vibrations.** Advanced techniques in dynamics and vibrations. Prerequisite: MAE 6180. (3F)

7580. Advanced Finite Element Analysis in Fluid Mechanics. Application of the finite element method of analysis to problems in fluid mechanics. Use of higher order element to two- and three-dimensional flows. Prerequisites: CEE 3510, 6570; or MAE 3420, 5020. (3Sp)

7930. Special Problems. Independent or group study of engineering problems not covered in regular course offerings. (1-3F,Sp,Su) ®

7970. Dissertation Research. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

***Taught alternate years. For further information, consult department.

Interdepartmental Specialization in

Molecular Biology

Director: Professor *Joseph K.-K. Li*, Department of Biology
Office in Veterinary Science Building 323, (435) 797-1914

Professors *Anne J. Anderson*, Biology, Toxicology; *Steven D. Aust*, Chemistry and Biochemistry, Toxicology; *Noelle E. Cockett*, Animal, Dairy and Veterinary Sciences; *Roger A. Coulombe, Jr.*, Animal, Dairy and Veterinary Sciences; *Linda S. Powers*, Biological and Irrigation Engineering; *William H. Scouten*, Chemistry and Biochemistry; *Jon Y. Takemoto*, Biology; **Associate Professors** *Gregory J. Podgorski*, Biology; *Peter C. Ruben*, Biology; *Dennis L. Welker*, Biology; **Assistant Professors** *Daryll B. DeWald*, Biology; *Scott A. Ensign*, Chemistry and Biochemistry; *Jeanette M. Norton*, Plants, Soils and Biometeorology; *Lance C. Seefeldt*, Chemistry and Biochemistry; *Paul G. Wolf*, Biology; **Research Associate Professor** *John D. Morrey*, Animal, Dairy and Veterinary Sciences; **Research Assistant Professors** *Thomas A. Grover*, Chemistry and Biochemistry; *Joanne E. Hughes*, Biology

Degrees offered: Master of Science (MS), Doctor of Philosophy (PhD) specialization in cooperating departments

This graduate program brings together faculty and students interested in molecular biology. Faculty associated with the program are from the Interdepartmental Curriculum in Toxicology and from the departments of Biology; Chemistry and Biochemistry; Animal, Dairy and Veterinary Sciences; Biological and Irrigation Engineering; and Plants, Soils, and Biometeorology.

The MS and PhD degrees with specialization in Molecular Biology are offered through participating departments. Current degrees are Animal, Dairy and Veterinary Sciences/Molecular Biology; Biological and Agricultural Engineering/Molecular Biology; Biology/Molecular Biology; Biochemistry/Molecular Biology; Plant Science/Molecular Biology; and Toxicology/ Molecular Biology. Students must be admitted both to the Molecular Biology Program and to a participating department, and must meet the degree requirements of both the department and the program. All students in Molecular Biology must

complete a core curriculum that consists of Biol 4200 and 5190. All program students must enroll in the seminar course, Biol 6890, each semester. Additional coursework will be tailored to the needs of the individual students by their graduate committees or may be required by the participating departments (see separate departmental descriptions). However, an emphasis is placed on research accomplishments in the training program.

The MS and PhD are awarded only upon completion of a thesis or dissertation describing an original contribution to science. In addition, candidates for the PhD must pass both written and oral examinations. All students must fulfill the requirements of the School of Graduate Studies.

Refer to the appropriate departmental entries in this catalog for further information or prerequisites for admission and matriculation, research opportunities, financial assistance, career opportunities, and course listings.

Further information can be obtained by contacting the Program in Molecular Biology, Utah State University, 5305 Old Main Hill, Logan UT 84322-5305.

Department of
Music

College of Humanities, Arts & Social Sciences

Head: Associate Professor *Bruce M. Saperston*, music therapy
Office in Fine Arts 107, (435) 797-3036

Assistant Heads: Professor *Gary Amano*, piano; **Associate Professor** *Dennis D. Griffin*, percussion, electronic music, composition

FAX (435) 797-1862
E-mail musicdep@cc.usu.edu
WWW http://www.usu.edu/~music/

Professors *Michael L. Ballam*, music history, group voice, Utah Festival Opera Company; *Warren L. Burton*, cello, elementary music, general education specialist, listening lab; *Michael K. Christiansen*, guitar program; *James M. Drake*, organ program; *Willard R. Kesling*, choral activities, chamber singers, orchestra, Northern Utah Choral Society; *F. Dean Madsen*, music theory, twentieth century music, composition; *Larry G. Smith*, jazz program, musicianship program, staff arranger, saxophone, jazz piano; **Professors Emeriti** *Max F. Dalby*, bands, woodwind, conducting; *Glen A. Fifield*, elementary music, cornet and trumpet; *Alvin Wardle*, music education, low brass; **Associate Professors** *Cindy J. Dewey*, vocal area, opera, musical theatre; *Mark A. Emile*, string performance and pedagogy, violin/viola; *Todd L. Fallis*, instrumental music education, student advising, low brass; *Nicholas E. Morrison*, clarinet, associate director of bands; **Associate Professor Emeritus** *Mildred Johnson*, music history and literature, musicianship program, viola; **Assistant Professors** *David Curtin*, piano, keyboard harmony; *Rick A. Stamer*, choral education; *Elizabeth York*, director of music therapy; **Assistant Professor Emeritus** *Betty Beecher*, piano; **Lecturers** *Leslie Timmons*, elementary music education, flute; *Ralph van der Beek*, piano instruction, youth conservatory; **Faculty Assistants** *Karen Carter*, music therapy; *Derek Furch*, jazz/pop choir, Sunburst Singers; *Dennis Hirst*, youth conservatory, Wassermann festival

Degrees offered: Bachelor of Arts (BA) and Bachelor of Music (BM) in Music; Bachelor of Science (BS) and BA in Music Therapy. The Master of Education (MEd) in Secondary Education includes a specialization in Music Education.

Undergraduate emphases: *BM degree in Music*–Music Education, Performance, Piano Pedagogy; *Two-year Certificate Programs*–Piano, Organ, Church Music, Guitar

Undergraduate Programs

Objectives

The Department of Music provides instruction in music by: (1) offering service courses which contribute to the Liberal Arts and Sciences Program in the College of Humanities, Arts and Social Sciences and the College of Science, and to the University Studies Program of the University; (2) offering specific sequences of courses leading to professional preparation in music education, music therapy, and performance/pedagogy; and (3) providing public musical service to the University and the community.

The specific objectives of the programs in music for the music major are fourfold: (1) to prepare certified music teachers to serve effectively in elementary and secondary schools; (2) to prepare musically talented students for careers as professional performers and/or studio teachers; (3) to prepare registered music therapists to serve in educational and therapeutic settings; and (4) to prepare music students for graduate study in their areas of specialization.

Requirements

Admission Requirements. Admission requirements for the Department of Music include those described for the University in this catalog (see pages 43-46). In addition, transfer students must have a minimum 3.00 GPA in music courses and a minimum 2.75 GPA overall. Students in good standing and transfer students meeting transfer requirements may apply for admission to the department. All students planning to major in music, music education, or music therapy must complete an audition/interview as part of the application process. It is strongly recommended that prospective majors complete their audition/interview during the department's scholarship auditions in February preceding

matriculation at USU. To schedule an audition/interview, contact the department at (435) 797-3015.

Prospective majors in Music Therapy should complete the audition/interview prior to June 1 of the year of admission.

GPA Requirement. Students majoring in music, music education, or music therapy must maintain a minimum GPA of 3.0 in music courses and a minimum 2.75 GPA overall. All core curriculum classes must be completed with a *C*- or higher in order to progress to the next courses in sequence. A student receiving a grade lower than *C*- is placed on probation, and may repeat the course once to raise the grade to *C*- or higher. If the grade received on the repeat is lower than *C*-, the student is no longer a music, music education, or music therapy major.

Degree Requirements. All majors in the department must complete the music core curriculum. Although it is possible to complete the degree if these courses are begun after the first year of study, the department strongly recommends that students begin the core curriculum during the first year, completing the courses in the following recommended sequence. **Freshman Year:** *fall semester*–Musc 1110, 1130, 1150; *spring semester*–Musc 1120, 1140, 1160. **Sophomore Year:** *fall semester*–Musc 2130, 2150, 2170, 2180[1]; *spring semester*–Musc 2160[2], 3110, 3140; **Junior Year:** *fall semester*–Musc 3120, 3150, 3170[1]; *spring semester*–Musc 3130, 3160[3], 3180[1]. Additional requirements for specific emphasis areas are available from the Music Department Office, Fine Arts 102.

Recital and Concert Attendance. Recital and concert attendance is required and will be monitored. Students should turn in programs after attending concerts and recitals. A summary of attendance will be kept in the student's file. To graduate, students are required to attend a minimum of 10 concerts and 10 recitals each year.

Individual Performance and Jury Requirements. Music majors enroll in individual instruction each semester and practice regularly outside of lessons. Jury exams are held at the end of each semester to assess individual progress. To determine specific jury requirements for their area, students should contact their adviser.

Recital Participation. Each music education, performance, and pedagogy major is encouraged to appear in a departmental recital each semester. Four such appearances are required for graduation. Since junior and senior recital requirements vary, students should consult program advisers and degree requirement sheets for specific information.

Piano Proficiency Requirements. Music, Music Education, and Music Therapy majors must meet a minimum standard of piano proficiency before graduation. The specific requirements are detailed in the department's *Student Handbook*.

Placement Tests. In order to ensure smooth articulation, transfer students take placement tests and are placed appropriately within the core course sequences. These tests are administered before fall semester classes begin and may be given periodically throughout the year. For details, contact the Music Department Office, (435) 797-3015, Fine Arts 102.

[1]May be taken during a different semester, if necessary.

[2]Not required for all music areas. For more information, contact adviser.

[3]Offered during even-numbered years (2000, 2002, etc.).

Music Minor and Certificate Programs. Requirements for two-year certificate programs in guitar, piano, and organ, as well as for minors in music, are available in the Music Department Office, Fine Arts 102.

Additional Information and Updates

Degree requirements not listed above are listed on the Music Major Requirement Sheet and the Music Therapy Major Requirement Sheet. Additional requirements, including appropriate sequencing of courses, are listed in the *Department of Music Student Handbook.* For the most recent information regarding degree requirements and course sequencing, contact advisers over specific programs. Further information can also be obtained by contacting the Music Department Office, Fine Arts 102, or by visiting the department's web site.

Financial Support

Scholarships, grants, and work-study programs are available through the University. Information about these programs can be obtained by calling the Office of High School/College Relations, (435) 797-1129 or 1-800-488-8108. In addition, the Department of Music offers talent-based scholarships to undergraduate students and employs students as part-time workers. For scholarship information or to arrange an audition, contact the department at (435) 797-3730 or visit the department's web site.

Music Courses (Musc)

BCA 1010. Introduction to Music. Nontechnical course to develop understanding and enjoyment of music. Through study of musical elements, as well as historical, cultural, and social influences, an awareness of the relationship between techniques and aesthetic values in world music can be developed. (3F,Sp,Su) ©

1020. Fundamentals of Music. Indepth look at the basic elements of music. Notes, rhythm, scales, intervals, key signatures, chords, and composing a simple piece. (3F,Sp) ©

1110. Music Theory I. Fundamentals of music. Traditional diatonic harmony in four parts, using triads in root position, first inversion, and second inversion. Prerequisite: Knowledge of music notation. (3F)

1120. Music Theory II. Traditional harmony in four parts, using nonchord tones, seventh chords, and secondary dominant functions. Prerequisite: Musc 1110. (3Sp)

1130. Aural Skills I. First in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. (1F)

1140. Aural Skills II. Second in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisite: Musc 1130. (1Sp)

1150. Keyboard Harmony I. Development of keyboard skills, in conjunction with Musc 1110, for music majors and minors. (1F)

1160. Keyboard Harmony II. Development of keyboard skills, in conjunction with Musc 1120, for music majors and minors. (1Sp)

1310. Introduction to Music Therapy. Introduces students to the field of music therapy through lectures, readings, and experiential work. For music therapy majors only. (1F)

1320. Music Therapy Ensemble. Intended for music therapy majors. Designed to

help students increase their performance skills in the areas of accompanying, improvisation, and popular music styles. (1F,Sp) ®

1400. Beginning Group Piano. Group piano instruction for nonmusic majors. (1F)

1410. Intermediate Group Piano. Group piano instruction for nonmusic majors. (1Sp)

1420. Pedagogy Practicum. Provides piano students with actual teaching situations for the practical application of principles studied in piano pedagogy. Supervised planning, presentation, and evaluation of lessons. (3F,Sp) ®

1430. Piano Pedagogy I. Designed to prepare qualified pianists to teach piano effectively and to acquaint them with new materials and techniques from the beginning to intermediate levels. (3F)

1440. Piano Pedagogy II. Designed to prepare qualified pianists to teach piano effectively and to acquaint them with new materials and techniques from the intermediate to early advanced levels. (3Sp)

1450. Group Organ. Acquaints students with basic techniques of organ playing. Concentrates on hymn playing, and music for preludes and postludes. (1F,Sp) ®

CI 1460. Organ Literature I. First course in sequence acquainting students with the history of the development of the organ and the literature and composers associated with its history. (2F)

CI 1470. Organ Literature II. Second course in sequence acquainting students with the history of the development of the organ and the literature and composers associated with its history. (2Sp)

1480. Individual Piano Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private piano instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1500. String Techniques I. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the string instruments. (1F)

1510. String Techniques II. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the string instruments. (1Sp)

1520. Individual Viola Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private viola instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1530. Individual Violin Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private violin instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1540. Individual String Bass Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private string bass instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1550. Beginning Group Guitar. Fundamentals of guitar; basic chords, note reading, tablature reading, and accompaniment styles, including strumming and fingerpicking. (1F,Sp)

1560. Intermediate Group Guitar. Intermediate-level strumming and fingerpicking techniques, barre chords, and solos written in standard notation and tablature will be presented. (1F,Sp)

1580. Individual Guitar Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private guitar instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1600. Voice Techniques. Acquaints the nonvocal major with the vocal instrument; its mechanism, terminology, and techniques. (1F,Sp)

1610. Introduction to Musical Theatre. Survey course dealing with history, evolution, influence, practice, and production of the American Musical Theatre. (2Sp)

1620. Introduction to Opera. Survey course tracing history and style of opera from Peri and Caccini's "Eurdice" of 1594 to contemporary works of John Eaton and Phillip Glass. (2F)

1630. Individual Vocal Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private vocal instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1700. Individual Flute Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private flute instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1710. Individual Oboe Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private oboe instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1720. Individual Clarinet Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private clarinet instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1730. Individual Bassoon Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private bassoon instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1740. Individual Saxophone Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private saxophone instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1800. Percussion Techniques. Provides basic playing experience and theoretical understanding of percussion instruments. Designed for music majors. (1F)

1810. Individual Trumpet Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private trumpet instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1820. Individual Trombone Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private trombone instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1830. Individual French Horn Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private French horn instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1840. Individual Tuba/Euphonium Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private tuba/euphonium instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

1850. Individual Percussion Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private percussion instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

2130. Music Theory III. Traditional chromatic harmony in four parts, using modulation, mode mixture, and neapolitan and augmented sixth chords. Prerequisites: Musc 1110 and 1120. (3F)

2150. Aural Skills III. Third in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisites: Musc 1130 and 1140. (1F)

2160. Aural Skills IV. Fourth in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisites: Musc 1130, 1140, and 2150. (1Sp)

2170. Keyboard Harmony III. Development of keyboard skills, in conjunction with Musc 2130, for music majors. (1F)

2180. Computer Applications in Music. Presents operational knowledge of computer hardware and music software. Students use M101 work station to learn music notation, sequencing, and other select applications. (2F,Sp,Su)

2310. Introduction to Observational and Behavioral Methods in Music Therapy. Basic behavioral terminology and methods, including systematic observations and recording methods for use in music therapy. Students conduct observations in clinical settings in the community. (2F)

2320. Music Therapy Methods and Materials. Music interventions and techniques appropriate for a wide range of patient populations, including hospitalized children, older adults, and individuals with orthopedic handicaps. Prerequisites: Musc 1310 and 2310. (2Sp)

2400. Individual Organ Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private organ instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

2410. Individual Organ Instruction (Second Instrument) for Music Majors. Designed to give music majors private organ instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2420. Piano Literature I. Acquaints pianists with the standard piano composers and keyboard literature from the 14th Century to the Classical Period. (3F)

2430. Piano Literature II. Acquaints pianists with the standard piano composers and keyboard literature from the Classical Period to the Romantic Period. (3Sp)

2440. Piano Literature III. Acquaints pianists with the standard piano composers and keyboard literature from the Romantic Period to Impressionism. (3F)

2450. Piano Literature IV. Acquaints pianists with the standard piano composers and keyboard literature from the Impressionist Period to the present day. (3Sp)

2460. Individual Jazz Piano Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private jazz piano instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

2470. Individual Jazz Piano Instruction (Second Instrument) for Music Majors. Designed to give music majors private jazz piano instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2490. Individual Piano Instruction (Second Instrument) for Music Majors. Designed to give music majors private piano instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2500. Individual String Bass Instruction (Second Instrument) for Music Majors. Designed to give music majors private string bass instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2510. Individual Cello Instruction for Nonmusic Majors. Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private cello instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

2520. Individual Cello Instruction (Second Instrument) for Music Majors. Designed to give music majors private cello instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2530. Individual Viola Instruction (Second Instrument) for Music Majors. Designed to give music majors private viola instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2540. Individual Violin Instruction (Second Instrument) for Music Majors. Designed to give music majors private violin instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2550. Guitar Styles (Blues/Bluegrass). Designed to teach students to play blues and bluegrass guitar styles. Presentation of musical form and repertoire. Prerequisite: Knowledge of basic chords and some standard notation and/or tablature reading. (2F)

2560. Guitar Styles (Jazz/Classical). Designed to teach students to play jazz and classical guitar styles. Presentation and analysis of pieces which have become "standard" repertoire. Prerequisite: Knowledge of basic chords and some experience reading standard notation and/or tablature. (2Sp)

2570. Fingerboard Theory I. Basic music theory course in which students use the guitar as a tool for learning the fundamentals of music. (2F)

2580. Fingerboard Theory II. Follow-up to Musc 2570. Examination of theoretical concepts of music and how they can be visualized and played on the guitar. (2Sp)

2590. Individual Guitar Instruction (Second Instrument) for Music Majors. Designed to give music majors private guitar instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2600. Women's Choir. Performance of choral works in a large choral organization open to all women without auditions. (1F,Sp) ®

2610. Choral Society. Large select mixed choir performing major works for chorus and orchestra. Admission by audition only. (1F,Sp) ®

2640. Individual Vocal Instruction (Second Instrument) for Music Majors. Designed to give music majors private vocal instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2700. Woodwind Techniques I: Recorder, Flute, and Clarinet. Provides music education major with an introduction to performance and pedagogy for the recorder, flute, and clarinet. Enrollment limited to majors or with permission of instructor. (1F)

2710. Woodwind Techniques II: Saxophone, Oboe, Bassoon. Provides music education major with an introduction to performance and pedagogy for the saxophone, oboe, and bassoon. Enrollment limited to majors or with permission of instructor. Prerequisite: Musc 2700. (1Sp)

2720. Marching Band. Preparation of musical entertainment and marching drills for football games. Prerequisite: Consent of director. (2F) ®

2730. Basketball Band. Preparation of "pops" type music for basketball games. Audition necessary. Prerequisite: Musc 2720. (1Sp) ®

2740. Recorder Techniques. Provides music majors with introduction to performance and pedagogy of the recorder, including solo repertoire and ensembles. Prerequisite: Music major or permission of instructor. (1Sp)

2750. Individual Flute Instruction (Second Instrument) for Music Majors. Designed to give music majors private flute instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2760. Individual Oboe Instruction (Second Instrument) for Music Majors. Designed to give music majors private oboe instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2770. Individual Clarinet Instruction (Second Instrument) for Music Majors. Designed to give music majors private clarinet instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2780. Individual Bassoon Instruction (Second Instrument) for Music Majors. Designed to give music majors private bassoon instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2790. Individual Saxophone Instruction (Second Instrument) for Music Majors. Designed to give music majors private saxophone instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2800. Brass Techniques I. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the brass instruments. (1F)

2810. Brass Techniques II. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the brass instruments. (1Sp)

2850. Individual Trumpet Instruction (Second Instrument) for Music Majors. Designed to give music majors private trumpet instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2860. Individual Trombone Instruction (Second Instrument) for Music Majors. Designed to give music majors private trombone instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2870. Individual French Horn Instruction (Second Instrument) for Music Majors. Designed to give music majors private French horn instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2880. Individual Tuba/Euphonium Instruction (Second Instrument) for Music Majors. Designed to give music majors private tuba/euphonium instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

2890. Individual Percussion Instruction (Second Instrument) for Music Majors. Designed to give music majors private percussion instruction at any and all stages of advancement. One credit given for 30-minute lessons. (1F,Sp,Su) ®

DHA 3010. Masterpieces of Music. Acquaints students with great masterpieces of music representing all periods of music history. Examines lives and times of various composers. (3F,Sp)

DHA 3020. History of Jazz. Designed to give students an understading of the development of jazz, popular music, and contemporary idioms, and their contributions to music and culture. (3Sp)

3110. Music History I: Origins through Baroque. History and literature of early, Renaissance, and Baroque periods. Prerequisite: Musc 2130. (3Sp)

3120. Music History II: Classical and Romantic Periods. History and literature of the music of the classical and romantic periods. Prerequisite: Musc 3110. (3F)

CI 3130. Music History III/Theory IV: The Twentieth Century. Study of Twentieth Century music history and literature. Includes Twentieth Century tonal, atonal, and avant garde harmonies and compositional techniques. Prerequisites: Musc 3110, 3120, 3140, 3150. (3Sp)

3140. Musical Form I: Polyphonic Procedures. Study of imitative, cantus firmus, ostinato, and free contrapuntal procedures of Western music. Explores techniques of Sixteenth Century counterpoint in two voices. Prerequisites: Musc 1110, 1120, 2130. (2Sp)

3150. Musical Form II: Sectional Form. Study of phrase and period structure, small part forms, theme and variations, rondo and sonata forms, and vocal forms in Western music. Prerequisites: Musc 1110, 1120, 2130, 3140. (2F)

****3160. World Music.** Explores music traditions of non-Western cultures throughout the world. Prerequisites: Musc 2130. (2Sp)

3170. Conducting. Designed to provide students with basic conducting techniques. (2F,Sp)

3180. Scoring and Arranging. Theoretical and practical study of scoring for orchestral instruments in various combinations, ranging from small ensembles to full orchestra. (2F,Sp)

3220. Choral Methods and Materials. Investigates factors relating to administration and teaching of choral music in middle and secondary schools. (2F)

3230. Choral Literature. Survey of choral music from the Renaissance, Baroque, classical, romantic, and Twentieth Century suitable for middle and secondary school choirs. (2Sp)

3240. Instrumental Methods and Materials. Examination of teaching methods and materials related to wind and percussion pedagogy. Study of literature, organization and administration, and teaching techniques. (2Sp)

3250. General Music Practicum. Provides experience in current materials, methods, and management of general music education program in secondary (grades 6-12) public schools. Designed for music education majors. (3Sp)

3260. Elementary School Music. Methods and materials in singing, rhythms, creating music, listening, using classroom instruments, fundamentals of music, and movement skills, with emphasis on contemporary approaches to music education. Recommended: Musc 1010. (2F,Sp,Su)

3270. Teaching Strategies and Practicum in Elementary Music. In-depth applications of Orff, Kodaly, Dalcrose, and other current methodologies in music education. Includes curriculum design, assessment, and instructional and performance skill development. Students complete a K-6 music teaching practicum experience. Prerequisites: Musc 1110, 3260. (3Sp)

3300. Music Therapy Practicum. Supervised practicum experience in a community setting with disabled adults, children, older adults, or individuals in a medical setting. Prerequisite: Musc 2320. (1-3F,Sp) ®

3310. Music Therapy and the Exceptional Child. Effects of music on physical, social, cognitive, and communication skills of children with disabilities. Prerequisite: Musc 2320. (3F)

3320. Psychology of Music I. Psychological foundations of musical behavior, including psychoacoustics, rhythmic, melodic, and harmonic foundations; affective behaviors and music; musical preferences; functional music; musical ability; and music learning. Prerequisite: ECE 3260 or permission of instructor. (2F)

3360. MIDI Studio Techniques. Elements of synthesizer sound production and basic studio techniques. (2Sp)

3370. Sound Recording and Reinforcement Techniques. Explores techniques of studio recording, including microphones, mixing, and signal processing. (2Sp) ®

3400. Individual Piano Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private piano instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3410. Ensemble and Accompanying. Accompanying vocal and instrumental works. Ensemble music for two pianos and four hands. Sight reading and repertoire development. Admission by audition only, with 16 students per section. (1-2F,Sp) ®

3420. Keyboard Skills I. Study of sightreading, transposing, improvising, figured bass, scales, chords, and score rendering. (3F)

3430. Keyboard Skills II. Continuation of Musc 3420, with further study of sightreading, transposing, improvising, figured bass, scales, chords, and score reading. (3Sp)

3440. Individual Jazz Piano Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private jazz piano instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3460. Church Music for Organists I. Designed to teach organists the fundamentals of organ playing. Emphasizes development of manual and pedal skills enabling organ students to master hymn playing, preludes, and postludes in church service playing. (2F)

3470. Church Music for Organists II. Continuation of Musc 3460. (2Sp)

3480. Individual Organ Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Flexible course of study leading to enhanced musical and technical skills on the instrument. Prerequisite: Permission of instructor. (1-2F,Sp,Su) ®

3500. Symphony Orchestra. Provides experience in performing standard orchestral literature. Admission by audition only. (1F,Sp) ®

3510. Orchestra Literature. Survey of materials, methods, and literature appropriate for elementary school, junior high/middle school, or high school level orchestra programs. (2Sp)

3520. String Pedagogy and Solo Literature. Two-semester sequence for qualified string players whose interest is primarily in teaching stringed instruments. Materials and teaching techniques via actual teaching experience. Prerequisite: Permission of instructor. (2F,Sp) ®

3550. Individual Guitar Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private guitar instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3560. Guitar History and Literature. Development of guitar from its earliest ancestors to the present, including study of composers of music for guitar, guitarists, and changes to the instrument itself. (3Sp)

3570. Guitar Pedagogy I. Prepares qualified guitarists to teach beginning and intermediate level students. Familiarizes participants with “business” aspects of teaching, how to set up a private studio, available materials, and teaching techniques. (2F)

3580. Guitar Pedagogy II. Instruction in teaching various guitar styles. Experience in teaching class guitar and in private instruction. Review of available methods and materials. (2Sp)

3590. Electric Guitar Ensemble. Offers opportunity for guitarists to rehearse and perform ensemble music written for electric guitar. Ensemble includes bass and drums. (1F,Sp) ®

3600. Opera Workshop. Techniques of musical theater, including participation as cast or crew in musical or operatic stage productions or excerpts. (1-3F,Sp) ®

3610. Vocal Repertory I. Survey of German Lieder and French Melodie, including styles, history, and performance practice. (2F)

3620. Vocal Repertory II. Survey of Italian, American, and British song, including styles, history, and performance practice. (2Sp)

3630. Vocal Pedagogy I. Theoretical course studying anatomy and function of the voice, methods for teaching techniques, respiration, phonation, articulation, and support and health of the voice. (2F)

3640. Vocal Pedagogy II. Application of vocal theory to teaching of young, post-pubescent, and mature male and female voices, including challenges of teaching each particular type. Includes practicum in which students teach individual vocal lessons under instructor's supervision. (2Sp)

3650. Diction. Study of singing diction in English and Italian, using International Phonetic Alphabet in spoken, sung, and written drills. (3Sp)

3670. Individual Vocal Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private vocal instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3700. Woodwind Ensemble. Helps students gain knowledge and understanding of literature for woodwind ensemble, to gain knowledge of rehearsal techniques for perfecting chamber music, and to demonstrate mastery of these skills through performance. Prerequisite: Permission of instructor. (1-2F,Sp) ®

3710. Individual Flute Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private flute instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3720. Individual Oboe Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private oboe instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3730. Individual Clarinet Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private clarinet instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3740. Individual Bassoon Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private bassoon instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3750. Individual Saxophone Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private saxophone instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3760. Jazz Ensemble. Preparation and performance of big band jazz music. Admission by audition only. (1F,Sp) ®

3770. Jazz Orchestra. Preparation and performance of big band jazz music. Admission by audition only. (1F,Sp) ®

3780. Flute Ensemble. Helps students gain knowledge and understanding of flute ensemble, to gain knowledge of rehearsal techniques for perfecting chamber music,

and to demonstrate mastery of these skills through performance. Prerequisite: Permission of instructor. (1F,Sp) ®

3790. Symphonic Band. Performance of significant works from symphonic band repertoire. Admission by audition or consent of instructor. (1F,Sp) ®

3800. Trombone Ensemble. Intended for trombone majors and nonmajors interested in performing music specifically written and/or arranged for four to twelve trombones. (1F,Sp) ®

3810. Individual Trumpet Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private trumpet instruction at any and all stages of advancement. (1-2F,Sp) ®

3820. Individual Trombone Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private trombone instruction at any and all stages of advancement. (1-2F,Sp) ®

3830. Individual French Horn Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private French horn instruction at any and all stages of advancement. (1-2F,Sp) ®

3840. Individual Tuba/Euphonium Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private tuba/euphonium instruction at any and all stages of advancement. (1-2F,Sp) ®

3850. Brass Ensemble. Helps students gain knowledge and understanding of brass ensemble, gain knowledge of rehearsal techniques for perfecting chamber music, and demonstrate mastery of these skills through performance. Prerequisite: Permission of instructor. (1F,Sp) ®

3860. Individual Percussion Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private percussion instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

3870. Percussion Ensemble. Provides opportunity for percussionists to perform select percussion literature in a chamber music setting. (1F,Sp) ®

3900. Jazz Improvisation. Study of techniques of jazz improvisation applicable to all instruments. (2F,Sp)

3910. Individual Composition Instruction. Individual study of techniques and procedures of music composition, emphasizing assistance in completing individual compositional projects, building composition portfolio, and preparing for composition recitals. Prerequisite: Permission of instructor. (1-2F,Sp) ®

3920. Marching Band Techniques. Reviews methods and materials necessary for directing high school marching bands, including administration, music selection, drill design, and computer-assisted instruction. Prerequisite: Instructor's permission. (2F)

3930. Band Literature. Study of literature appropriate for beginning, intermediate, and advanced level band programs. Prerequisite: Instructor's permission. (2F)

3950. Jazz Choir. Emphasizes vocal ability, harmonic ear training, and rhythmic understanding. Ability to vocally improvise is helpful, though not a necessary prerequisite. Auditions held during the first week of fall semester. (1F,Sp) ®

3960. Sunburst Singers. Performance as the Aggie Carolers, locally and in Sun Valley, Idaho, and in the exciting Sunburst Club "Evening with Glenn Miller," with the best of big band and broadway-styled entertainment. Auditions held in April. (1F,Sp) ®

4310. Music Therapy with Adult Populations. Music therapy methods for adults with major mental illness. Overview of DSM-IV criteria. Psychotherapy models, including cognitive-behavioral and person-centered approaches to treatment. (3F)

CI 4320. Psychology of Music II. Research and laboratory course, emphasizing design, methods, and statistical procedures appropriate to research in music education and music therapy. Prerequisites: Musc 3320, ECE 3260, Stat 1040. (2Sp)

4330. Clinical and Professional Issues in Music Therapy. Ethical considerations and issues related to private practice, marketing, and reimbursement, as well as continued exploration of psychotherapeutic models and MT methods with adults, specifically anxiety disorders and personality disorders. Prerequisite: Musc 4320. (2Sp)

4340. Internship in Music Therapy. Six-month resident internship in affiliated, approved clinical setting. Prerequisite: Successful completion of senior year in music therapy. (2F,Sp)

4360. MIDI Studio Practicum. Students sharpen their MIDI studio skills by working on an individual MIDI musical production. Prerequisite: ECE 3260. (1-3F,Sp) ®

4370. Sound Recording and Reinforcement Practicum. Students sharpen their recording studio skills by working on an individual musical production. (1-3F,Sp) ®

4410. Advanced Piano Pedagogy I. Continuation of Musc 1430 and 1440, with analysis, performance, and teaching of basic repertoire at intermediate to advanced levels. Prerequisites: Musc 1430, 1440. (1-2F) ®

4420. Advanced Piano Pedagogy II. Continuation of Musc 4410, with analysis, performance, and teaching of basic repertoire at intermediate to advanced levels. Prerequisite: Musc 4410. (1-2Sp) ®

4500. String Ensemble. Offers opportunity for capable string players to study and perform music written for variety of small ensemble combinations. (1F,Sp) ®

4510. Individual Violin Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private violin instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

4520. Individual Viola Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private viola instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

4530. Individual Cello Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private cello instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

4540. Individual String Bass Instruction for Music Majors. Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private string bass instruction at any and all stages of advancement. (1-2F,Sp,Su) ®

4550. Acoustic Guitar Ensemble. Offers opportunity for guitarists to rehearse and perform intermediate and advanced music written for acoustic guitar. (1F,Sp) ®

4600. University Chorale. Select mixed choir performing a wide range of choral literature. Admission by audition only. (1F,Sp) ®

4610. National Standards Choir. Choral ensemble focusing on music education through choral performance. Explores methods for teaching music through performance to middle and high school students. Special attention paid to National Standards in Music. (1F,Sp) ®

4620. Choral Conducting Practicum. Application of principles of choral music education in public school setting. (1F,Sp) ®

4650. Chamber Singers. Select small ensemble performing a wide range of choral literature. Admission by audition only. (1F,Sp) ®

4700. Wind Orchestra. Highly-selective group, performing important traditional and contemporary works from the wind band repertoire. Entrance by audition only. (1F,Sp) ®

4900. Baroque Counterpoint. Writing and analysis of tonal counterpoint in two, three, and four parts. Prerequisites: Musc 1110, 1120, 2130, 3140. (2F)

4910. Music Composition. Instruction in principles of music composition, and guidance in completing individual composition projects. Also, analysis of selected Twentieth Century masterworks. Prerequisites: Musc 1110, 1120, 2130, 3140. (2Sp) ®

4920. Individual Recital. Performance of pieces selected by the student and approved by the instructor, for performance in accordance with specific music area requirements. (1-6F,Sp,Su) ®

4930. Readings and Conference. Undergraduate course designed to provide special interest study. (1-3F,Sp,Su) ®

4940H. Senior Thesis. As partial fulfillment of Honors Program requirements, students design and complete a major paper/project. Examples of projects include performance, composition, and musical analysis. (1-6F,Sp,Su) ®

6100. Graduate Performance Ensemble. Designed to give students opportunity for a high-level music experience in choral and instrumental performance ensembles. (1-2F,Sp) ®

6110. Advanced Conducting. Students master manual technique of conducting and improve score study procedures, resulting in analysis and communication of musical ideas. (2F,Su)

6120. Advanced Rehearsal Techniques. Provides students with conducting experience within their major performance areas; i.e., chorale, band, orchestra. This is accomplished through observation of rehearsal techniques and procedures, and by conducting rehearsals at the instructor's discretion. (2F,Sp) ®

6130. Seminar in Music: Philosophy, Aesthetics, and Trends. Study of philosophical bases for human responses to music and resulting musical behaviors. (2F,Su)

6610. Practicum in Choral Performance. Provides the graduate student with insight into advanced choral techniques and methods of preparing choirs for performance by rehearsing one of the University choirs on assigned choral selections while being critiqued by the ensemble director. (1-4F,Sp) ®

6620. Seminar in Choral Literature. Designed to study and internalize principal forms of choral music through discussion of historical evolution and stylistic characteristics of the periods of music. Embraces significant choral functions of every style period. (2Sp,Su)

6630. Individual Instruction for Graduates. Includes 60-minute lessons for either 1 or 2 credits. Number of credits granted depends upon practice time and extent of literature required. Designed to give graduate students private instruction at any and all stages of advancement. Prerequisite: Instructor's permission. (1-2F,Sp) ®

6900. Independent Study. Advanced course designed to meet specific problems of the music educator and the applied music specialist. (1-2F,Sp,Su) ®

6910. Individual Recital. Preparation and presentation of graduate recital, under supervision of major professor. (1-3F,Sp,Su) ®

6980. Research and Thesis. Individual work in thesis writing with guidance and criticism. (2-6F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Interdisciplinary Certificate Program in

Natural Resource and Environmental Policy

Director: Associate Professor *Joanna Endter-Wada*, Department of Forest Resources
Office in Natural Resources 355B, (435) 797-2487

Program Office: Natural Resources 355, (435) 797-2797

Affiliated Faculty: Professors *Loren R. Anderson*, Civil and Environmental Engineering; *Caryn Beck-Dudley*, Management and Human Resources; *David S. Bowles*, Civil and Environmental Engineering; *Anne M. Butler*, History; *John R. Cragun*, Management and Human Resources; *R. Ryan Dupont*, Civil and Environmental Engineering; *Herbert H. Fullerton*, Economics; *E. Bruce Godfrey*, Economics; *Craig W. Johnson*, Landscape Architecture and Environmental Planning; *John E. Keith*, Economics; *James J. Kennedy*, Forest Resources; *Richard S. Krannich*, Sociology, Social Work and Anthropology; *Ronald L. Little*, Sociology, Social Work and Anthropology; *Kenneth S.*

Lyon, Economics; *Glenn M. McEvoy*, Management and Human Resources; *Joan R. McFadden*, Human Environments; *Clyde A. Milner II*, History; *Jon R. Moris*, Sociology, Social Work and Anthropology; *Carol A. O'Connor*, History; *F. Ross Peterson*, History; *V. Philip Rasmussen*, Plants, Soils, and Biometeorology; *David L. Rogers*, Sociology, Social Work and Anthropology; *Randy T. Simmons*, Political Science; *Donald L. Snyder*, Economics; *Philip R. Swensen*, Business Administration; *Richard E. Toth*, Landscape Architecture and Environmental Planning; *Frederic H. Wagner*, Fisheries and Wildlife; *Wynn R. Walker*, Biological and Irrigation Engineering; **Associate Professors** *Dale J. Blahna*, Forest Resources; *Mark W. Brunson*, Forest Resources; *D. Layne Coppock*, Rangeland Resources; *Susan E. Dawson*, Sociology, Social Work and Anthropology; *William J. Doucette*, Civil and Environmental Engineering; *Edward W. Evans*, Biology; *Kitt Farrell-Poe*, Agricultural Systems Technology and Education; *Christopher Fawson*, Economics; *David B. Goetze*, Political Science; *James W. Haefner*, Biology; *Thomas B. Hardy*, Civil and Environmental Engineering; *Michael R. Kuhns*, Forest Resources; *Audrey D. Levine*, Civil and Environmental Engineering; *David R. Lewis*, History; *Robert J. Lilieholm*, Forest Resources; *Gary E. Madsen*, Sociology, Social Work and Anthropology; *John K. Nicholson*, Landscape Architecture and Environmental Planning; *G. Allen Rasmussen*, Rangeland Resources; *John C. Schmidt*, Geography and Watershed Science; *Robert H. Schmidt*, Fisheries and Wildlife; *David K. Stevens*, Civil and Environmental Engineering; *David G. Tarboton*, Utah Water Research Lab and Civil and Environmental Engineering; *Veronica Ward*, Political Science; **Research Associate Professor** *Darwin L. Sorensen*, Biology, Civil and Environmental Engineering, and Utah Water Research Laboratory; **Assistant Professors** *Helen R. Aspaas*, Geography and Earth Resources; *Christopher Conte*, History; *Cathy L. Hartman*, Business Administration; *Lori M. Hunter*, Sociology, Social Work and Anthropology; *Michael S. Lyons*, Political Science; *Anthony A. Peacock*, Political Science; *Edwin R. Stafford*, Business Administration; *Quinn R. A. Weninger*, Economics; **Science and Reference Librarian:** *Anne E. Hedrich*, Sci-Tech Library

Graduate Program Description

The Natural Resource and Environmental Policy Certificate is designed to prepare resource and environmental professionals to meet current public policy challenges. Many of the problems confronting natural resource and environmental managers are social, as well as technical, in nature. Public involvement in decision making, equity concerns, and conflict management is becoming a critical issue. Resource professionals are increasingly challenged to design management strategies and public policies that maximize human well-being, environmental quality, and ecological integrity. The policy certificate is an interdisciplinary program to train students for careers in government, education, consulting, and conservation.

The certificate program provides students with a comprehensive educational framework for understanding complex natural resource and environmental concerns and to develop the critical thinking and analytical skills needed to address these issues. Students develop familiarity with both disciplinary and interdisciplinary concepts and principles of the social, natural, and physical science approaches to natural resource policy. Students engage in educational activities and thesis projects designed to apply this training to current policy issues. The primary objective is to prepare students to develop innovative, creative, and feasible natural resource and environmental policies and management strategies.

All eight colleges, as well as sixteen departments, at Utah State University participate in the Natural Resource and Environmental Policy Program and are represented on the Policy Program Advisory Committee.

Certificate

Students who complete the Policy Program receive a certificate in Natural Resource and Environmental Policy. Notification of this certificate appears on the student's transcript.

Admission Requirements

Admission to the Certificate Program is open to students accepted into a Plan A (thesis) master's degree program or a doctoral degree program at Utah State University who have satisfied the prerequisites outlined in the next paragraph. Admission is also available for students accepted into Plan B or Plan C master's degree programs, provided their degree program requirements include development of a written research paper or project report that will be presented to and defended before the student's graduate committee. In all cases, the thesis, research report, or dissertation must contain a significant component addressing natural resource or environmental policy dimensions of the research.

Prerequisites for acceptance into the Natural Resource and Environmental Policy Graduate Certificate Program are (1) acceptance into an approved master's or doctoral degree program at Utah State University; (2) undergraduate or other experience in the natural and social sciences; and/or (3) demonstrated understanding of general ecological principles, earth processes, and social systems. A standing Admissions Subcommittee of the Policy Program Advisory Committee reviews graduate student requests for admission to the program to determine whether prerequisites have been met.

To meet the natural sciences prerequisite, students must have taken an upper-division course focusing on the operation of natural systems, such as a course in ecology, biological systems, ecosystem management, or earth processes. Professional experience equivalent to such a course is also considered as having met the natural sciences prerequisite. Students without sufficient natural science backgrounds are required to take an equivalent course at USU to fulfill the prerequisites prior to certificate coursework. Students should contact the Natural Resource and Environmental Policy Program office for a current list of suggested courses.

To meet the social sciences prerequisite, students must have taken an upper-division course focusing on the operation of social systems, such as a course from the fields of economics, political science, sociology, or anthropology. Professional experience equivalent to such a course may also be considered as having met the social sciences prerequisite. Students should contact the Natural Resource and Environmental Policy Program office for a current list of suggested courses.

Graduate Committee

The student's graduate committee must include one member affiliated with the Policy Program to advise the student on meeting the program requirements and in selecting core courses.

Course Requirements

The Graduate Certificate Program draws on a variety of courses to provide an integrated, interdisciplinary program. An

integrative cornerstone seminar offered each year as a team-taught course (NR 6430, Natural Resource and Environmental Policy Cornerstone Seminar), is normally taken in the student's first year. Students are expected to take at least four of the core policy courses listed below to gain perspective on different disciplinary approaches to natural resource policy. Another program activity is the Natural Resource and Environmental Policy Seminar, NR 6440, which features invited speakers and must be attended by students for credit. In another required seminar, NR 6450, graduating students make a presentation on the policy dimensions of their thesis or dissertation.

The following are the Natural Resource and Environmental Policy Certificate core courses: ASTE 5260, Environmental Impacts of Agricultural Systems; Econ 5560, Natural Resource and Environmental Economics; Econ 6550, Resource Economics I; FR 6000, Human Dimensions in Natural Resources Graduate Seminar; FR 5560, Natural Resources Law and Policy; FR 6530, Natural Resources Administration; FW 6350, Wildlife Damage Management Policy; Geog 5330, Large River Basin Management; Hist 6400, ST: American Environmental History Seminar; Hist 6880, ST: Environmental History Seminar; LAEP 6900, Special Problems: NEPA Course; PolS 5180, Natural Resource Policy; PolS 5200, Global Environment; RR 6300, Policy Aspects of Wildland Recreation; RLR 5100, Conflict Management in Natural Resources; Soc 6620, Environment, Technology, and Social Change; Soc 6630, Natural Resources and Social Development; WS/FR 5320, Water Law and Policy in the United States. Other courses may be included in the list of core courses by action of the Policy Program Faculty Advisory Committee.

Approved core courses may be part of a student's departmental requirements; however, only one core course taught in the student's home department may be applied toward the certificate.

Interdepartmental Curriculum for

Master of Natural Resources (MNR)

Degree Coordinator: Dean *F. E. "Fee" Busby*, College of Natural Resources
Office in Natural Resources 108, (435) 797-2452

Degree offered: Master of Natural Resources (MNR)

Objectives

The Master of Natural Resources (MNR) is a professional degree designed to prepare students to work in the interdisciplinary context of the 21st Century. It is a nonthesis program, intended for students and practicing professionals with a career orientation in natural resource management.

Admission Requirements

All MNR students are admitted through one of the four College of Natural Resources departments, following School of Graduate Studies standard procedures and policies (see pages 60-61). As with other USU master's degrees, each student must be accepted by a faculty member (major professor) who agrees to guide the student in the MNR program.

Undergraduate prerequisites include courses in chemistry, physics, botany, zoology, ecology, economics, political science, algebra, and statistics; and at least three courses in natural resources disciplines. Students without undergraduate degrees in natural resources or similar majors will be required to make up deficiencies in undergraduate preparation prior to beginning MNR degree coursework.

Course Requirements

The degree program includes two required core courses, courses in specified topic areas, and elective courses. The specific coursework required for each student will be determined by the major professor and the two other members of the student's graduate committee.

Cooperative

Nursing Program

College of Science

Weber State University/Utah State University

Coordinator: Assistant Professor *Pamela E. Hugie*
Office in Lundberg Building 201, (435) 797-1515

Assistant Professors *Joanne Duke, Pat Johnson, Joyce Murray, Kelly Shoell, Carol Whitesides*; **Instructor** *Irene Smith-Kent*

Undergraduate Program

Objectives

Weber State University and Utah State University jointly offer an Associate Degree Program in Nursing at Logan.

All nursing theory, University Studies (General Education), and laboratory practice classes are offered on the Utah State University campus and in health service agencies within Weber, Box Elder, and Cache Counties.

Weber State University admits the prospective student and grants the Associate of Science degree upon the student's completion of the course. The student participates in pinning ceremonies held on the Utah State University Campus and graduation ceremonies held on the Weber State University campus.

Departmental Admission Requirements

Students apply for admission to the Cooperative Nursing Program by contacting the coordinator of the program, Lundberg Building, Room 201, 3250 Old Main Hill, Utah State University, Logan UT 84322-3250.

The student's application is handled through the Office of Nursing Admissions, Weber State University, Ogden UT 84408. Applicants have until February 14 to complete their application process. All application forms must be completed and sent to the Nursing Program admissions secretary at Weber State University. Notifications of status are sent to applicants around May 1.

A graduate of this program is eligible to write the State Board licensing examination to become a registered nurse. The program is accredited by the Utah State Board of Nursing and the National League for Nursing.

Students admitted to the program have the prerogative of taking the licensing examination for Practical Nursing upon an equivalency basis with the completion of the first year's course of studies.

Requirements

The curriculum listed below is planned over a six-semester period, using two academic years plus two summer semesters. It is planned to include a broad University Studies (General Education) program concurrently with courses in Nursing.

Nursing Courses (Nurs)

1030. Nursing Foundations. Assists students in developing fundamental skills and identifying simple nursing problems related to basic needs of people. (7F)

1040. Maternal/Newborn Nursing. Develops skills and knowledge relating to the intrapartal period for the entire family. (3Sp)

1045. Care of Adult and Pediatrics. Explores nursing skills and knowledge development relating to health care issues across the life span. (5Sp)

1050. Beginning Pharmacology. Strengthens student's knowledge of pharmacological agents and therapeutic treatment modalities. (2F)

2050. Advanced Pharmacology. Strengthens student's knowledge relating to advanced therapeutic agents and treatment modalities. (2F)

2060. Mental Health Nursing. Provides opportunities for students to practice the skills and learn the theoretical bases of mental health nursing. (3F)

2070. Medical Surgical Nursing. Prepares students to care for medical and surgical clients across the life span. (7F)

2080. Capstone Nursing. Integration and application of all previous training in the program into a strong clinical experience. Includes management and administration in nursing. (5Sp)

Health Science 2300. Introduction to Pathophysiology. Nature of disease and its effect upon body systems. (3Su)

Department of

Nutrition and Food Sciences

College of Agriculture and College of Family Life

Head: Professor *Ann W. Sorenson*, nutrition
Office in Nutrition and Food Sciences 212, (435) 797-2126

FAX (435) 797-2379
E-mail: nfs@cc.usu.edu
WWW http://www.usu.edu/~famlife/nfs/index.html

Professors *Rodney J. Brown*, food science, food and dairy chemistry; *Conly L. Hansen*, food science, food engineering; *Deloy G. Hendricks*, nutrition, food storage; *Donald J. McMahon*, food science, dairy chemistry and technology; *Von T. Mendenhall*, food science, meat technology; *Bonita W. Wyse*, nutrition, dietetics, nutrition education; **Distinguished Professor Emeritus** *R. Gaurth Hansen*; **Professors Emeritus** *Gary H. Richardson, D. K. Salunkhe*; **Associate Professors** *Charlotte P. Brennand*, food science, food flavor and sensory evaluation; *Jeffery R. Broadbent*, food science, microbial genetics; *Charles E. Carpenter*, food science, muscle biochemistry and physiology, meat processing; *Daren P. Cornforth*, food science, meat and muscle chemistry; *Georgia C. Lauritzen*, nutrition, dietetics; *Ronald G. Munger*, nutrition, epidemiology, and public health; *Paul A. Savello*, food science, dairy processing; *Bart C. Weimer*, food science, dairy microbiology; **Clinical Associate Professor** *Noreen B. Schvaneveldt*, dietetics; **Assistant Professors** *Deborah R. Campbell*, nutrition, molecular epidemiology; *Nedra K. Christensen*, nutrition, dietetics; *Ilka Nemere*, nutrition, molecular nutrition; *Marie K. Walsh*, food science, dairy chemistry; **Teaching Assistant Professor** *Jeffrey P. Miller*, culinary arts/food service management; **Clinical Assistant Professors** *Janet B. Anderson*, dietetics; *Tamara S. Vitale*, dietetics, culinary arts/food service management; **Assistant Professor Emeritus** *Frances G. Taylor*

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Nutrition and Food Sciences

Undergraduate emphases: *BS, BA*–Nutrition Science, Public Health Nutrition, Dietetics, Culinary Arts/Food Service Management, Food Science, and Food Technology Management; **Graduate specializations:** *MS, MA, PhD*–Dietetics, Food Biotechnology, Food Chemistry, Food Engineering, Food Microbiology, Food Processing, Human Nutrition, Molecular Biology, and Nutrient Metabolism

Undergraduate Programs

Objectives

The Department of Nutrition and Food Sciences has the following three objectives:

1. To provide students with the scientific/academic background necessary to function well in further academic pursuits or future work environments.

2. To provide students with the critical thinking and problem solving skills necessary to enhance further academic pursuits or future work environments.

3. To provide students with practical application and work experience credentials to provide personal and employment satisfaction.

Dietetics. The Dietetics emphasis prepares students to become registered dietitians. Upon completion of the BS degree, graduates have professional entry-level skills in clinical nutrition, community/public health nutrition, and food service management and are in great demand in the job market. Students should complete two years of prerequisite coursework, and should apply for enrollment in the Dietetics Program by February 1 of the sophomore year. Students complete 1,000 hours of internship experiences during the junior and senior year. Senior students relocate to Salt Lake City fall semester to obtain extensive internship experiences in clinical and community settings.

The USU Dietetics Program is currently granted accreditation by the Commission on Accreditation/Approval for Dietetics Education of The American Dietetic Association, 216 West Jackson Blvd, Chicago IL 60606-6995, (312) 899-4876.

Food Science. Students receive an excellent background in chemistry, engineering, food processing, statistics, sensory evaluation, and microbiology. The Food Science program is approved by the Institute of Food Technologists. Graduates are in demand by industry for positions in research, quality control/assurance, product development, and processing. Government laboratories and regulatory agencies also hire food science graduates. With a food science degree, students can also qualify to enter graduate school.

Food Technology Management. The Food Technology Management program gives students a broad background in basic food science and in business administration to be applied to the business-oriented aspects of the food industry. Students also qualify for a Business Production Minor. Graduates are sought by private food industry and public institutions in management positions.

Culinary Arts/Food Service Management. This emphasis prepares students in the art and science of culinary arts, and provides the management principles needed to effectively manage a food service operation, including human resource management, financial management, time management, communications, etc. Students are required to obtain a minor in BA Marketing, MHR Management, or MHR Human Resource Management.

Nutrition Science. The Nutrition Science emphasis is for students who are interested in studying the molecular and cellular bases of human health and disease. Nutrition Science is a multi-disciplinary program in which students learn to apply techniques from the fields of molecular and cellular biology, physiology, genetics, and biochemistry to issues in nutrition. Students will gain experience in laboratory, clinical, and epidemiological methods, and may have the opportunity to gain laboratory research experience in nutrition studies being conducted by faculty members. The undergraduate Bachelor of Science degree qualifies a Nutrition Science student to find employment in industry or academic laboratories, as well as in government agencies. It can also be used as preparation for medical or graduate school.

Public Health Nutrition. The Public Health Nutrition emphasis is for students who are interested in studies of the role of nutrition in health and disease prevention at the community and population level. Public Health Nutrition is a multi-disciplinary program, and students learn the fundamentals of nutrition science, nutritional assessment, epidemiology, statistics, pubic health, and food safety. Students may have the opportunity to gain undergraduate research experience in studies being conducted in Utah and elsewhere by faculty at the USU Center for Population Studies of Human Nutrition. The undergraduate Bachelor of Science degree prepares a Public Health Nutrition student for employment in local, state, and federal health agencies, as well as in private health promotion and disease prevention agencies. It can also be used as preparation for medical school, other health professions, or graduate study in public health, nutrition, or related fields.

For more emphasis information about course sequences and requirements for admission, see major requirement sheet, available from the Department of Nutrition and Food Sciences, or visit the departmental home page at: http://www.usu.edu/~famlife/nfs/dietetics/.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Nutrition and Food Sciences are the same as those described for the University on pages 43-46. Students in good standing may apply for admission to the department. Students planning to major in Nutrition and Food Sciences should take algebra, chemistry, and biology in high school.

Graduation Requirements. Students graduating in the Department of Nutrition and Food Sciences graduate in the College of Agriculture and the College of Family Life. All graduates from the department must have completed one of the six emphasis areas in the department and must meet the following minimum requirements:

1. Grade point average (GPA) must be 2.5 or higher in all courses required for the major.
2. A grade of *C* or better must be received in all courses required for the major.
3. Courses required for the major may be repeated only once to improve a grade.
4. Courses required for the major may not be taken as *Pass-D-Fail* credits.

Minor in Nutrition and Food Sciences. Students from other majors may graduate with a minor in Nutrition and Food Sciences, offered only in the Food Science emphasis.

Bachelor of Science Requirements

Specific requirements for each emphasis are listed below. Requirements change periodically, and sequence of courses is important. Current course requirements and the order in which they should be taken can be obtained from the Department of Nutrition and Food Sciences.

Food Science Emphasis. The following courses are required: Biol 1210, 1230, 3300; Chem 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; Econ 1500; Math 1050, 1060, 1210; NFS 1000, 1020, 1250, 3100, 3110, 3250, 4070, 4440, 4920, 4990, 5020, 5030, 5110, 5500, 5510, 5560; Phyx 2210, 2220; PlSc 4600; Spch 3050; Stat 3000, 5300.

Food Technology Management Emphasis. The following courses are required: Acct 2010; BA 3500, 3700, 4720, 4790, 5730; Biol 1110; Chem 1110, 1120, 1130; Econ 1500; Math 1050, 1060, 1100; MHR 3110; NFS 1000, 1020, 1250, 3100, 3110, 3250, 4070, 4920, 4990, 5020, 5030, 5110, 5500, 5510, 5560; Phyx 1200; PlSc 4600; Psy 1010; Spch 3050; Stat 3000, 5300.

Culinary Arts/Food Service Management. The following courses are required: Acct 2010; BA 3500; Chem 1010; Econ 1500; HEnv 1750; MHR 2350, 2990, 3110; NFS 1000, 1020, 1240, 1250, 2030, 2050, 3000, 3030, 3060, 3110, 3500, 3510, 4250, 4720, 4810, 4840, 4850, 4990, 5760; Spch 2600, 3050. Students are required to choose a minor in BA Marketing, MHR Management, or MHR Human Resource Management.

Nutrition Science. The following courses are required: Biol 1210, 1220, 1230, 1240, 2000; Chem 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; Math 1050, 1060, 1210; NFS 1000, 1020, 2020, 3110, 4020, 4070, 4540, 4990, 5200, 5210, 5220, 5300; Phil 3500; Phyx 2110, 2120; Stat 3000.

Public Health Nutrition. The following courses are required: Biol 1110, 1210, 1220, 1230, 1240, 2000, 2200; Chem 1210, 1220, 1230, 1240, 2300, 3700; Math 1050, 1060, 1210; NFS 1000, 1020, 1250, 2020, 3020, 3110, 3250, 4020, 4070, 4480, 4540, 4550, 4560, 4990, 5200, 5210, 5300, 5630; PubH 5010; Stat 3000.

Dietetics. The following courses are required: Biol 2000; Chem 1210, 1220, 2300, 3700, 3710; Econ 1500; Math 1050; NFS 1020, 1250, 2020, 3020, 4020, 4050, 4060, 4070, 4480, 4540, 4550, 4560, 4570, 4580, 4660, 4710, 4720, 4730, 4740, 4750, 4780, 4990, 5210, 5300, 5750; Stat 1040.

Financial Support

The Department of Nutrition and Food Sciences, the College of Agriculture, and the College of Family Life award scholarships in addition to those available through the University Financial Aid Office. Information and application forms may be obtained from the department office. Students may also contact the department for assistance in finding employment that will enhance their academic studies. Many students are employed by the department and by private firms near the University.

Graduate Programs

Admission Requirements

Candidates for graduate study in the Department of Nutrition and Food Sciences need a background in chemistry, physics, mathematics, bacteriology, and physiology. Prior coursework in food science or nutrition is desirable. If deficient in these areas, a student may be accepted with the understanding that the supervisory committee will require competence equivalent to a BS degree in nutrition and food sciences in the preliminary (MS) or comprehensive (PhD) examination.

Students must meet some departmental requirements in addition to requirements of the School of Graduate Studies. The following minimum Graduate Record Examination scores are required for admission: Verbal, 470; Quantitative, 530; Analytical, 500; and Verbal, Quantitative, and Analytical combined, 1,500.

One year of general chemistry, two semesters of organic chemistry, and math at least equivalent to college algebra must be completed before matriculation. If taken as a graduate student, these courses will not be counted as graduate credit.

Before being accepted to work toward a PhD degree, a student must have obtained an MS degree or have a manuscript reporting original research accepted for publication in a refereed journal.

Before being accepted into the department, potential graduate students must be accepted by a faculty member who is willing to add them to his or her research team.

Registration Requirements

Once admitted, students are required to maintain enrollment as follows: at least 3 credits to use University facilities and receive direction (including thesis or dissertation direction) from their major professor; at least 6 credits if on a Graduate Teaching or Research Assistantship (9 credits if employed less than 15 hours per week); at least 9 credits if on a Research Fellowship or unsupported; at least 6 credits if receiving tuition waivers, student loans, or other University-administered financial aid; and no more than 6 credits if employed full time by the University.

Procedures

Progress toward an advanced degree is outlined in the School of Graduate Studies section (pages 64-67). Students are responsible to see that all requirements are fulfilled, and should read these procedures *carefully*.

Graduate students in the Department of Nutrition and Food Sciences should complete the following steps:

1. Choose Major Professor. Students are accepted into the department with a temporary adviser. Although this person must guarantee, at the time of acceptance, that the student may work in his or her research program, students may choose as their major professor any faculty member who can and is willing to accommodate them.

2. Establish Supervisory Committee. Faculty members who may serve on the student's supervisory committee should be considered in consultation with the major professor. A minimum of three members (at least two from the department), including the major professor, must be suggested for the MS program. At least five (three or more from the department and one or more from outside the department) must be suggested for a PhD program.

When the student and major professor have agreed on the committee members, a *Supervisory Committee Assignment* form must be prepared. The department head must approve the committee and may add members. It is the student's responsibility to meet with proposed committee members to make certain they are able and willing to serve. The *Supervisory Committee Assignment* form is then forwarded to the dean of the School of Graduate Studies for final approval.

The committee should be selected and the *Supervisory Committee Assignment* form submitted to the School of Graduate Studies no later than the second semester of an MS program or the third semester of a PhD program.

3. Select and Define Research Program. In consultation with the major professor, the student must choose a research area suitable for the MS thesis or PhD dissertation and prepare a Thesis or Dissertation Proposal. The proposal should include the following:

a. Title
b. Description of the problem based on the most current literature
c. Statement of the purpose of the intended research
d. Research plan
e. List of the references cited in a form acceptable for publication in a scientific journal in the student's field

4. Define Course Schedule. Students must decide, in consultation with their major professor, the courses they will take that will be on their Program of Study. They must fulfill the following minimum requirements for all graduate students in Nutrition and Food Sciences and take other courses to provide the background necessary to conduct their research.

a. **Biochemistry (Chem 5700, 5710)—**3 credits required for MS; 6 credits required for PhD.
b. **Statistics (Stat 5100, 5120, 5200, 5600)—**3 credits required for MS; 6 credits required for PhD.
c. **Graduate-level NFS courses—**PhD students must include 3 credits from NFS 6200, 6210, 6220, 6300, 6630; and 3 credits from NFS 6020, 6030, 6560, 6110.
d. **Additional graduate-level courses (from NFS or elsewhere)—**3 credits required for MS; 10 credits required for PhD.
e. **Graduate Seminar (NFS 7800)—**2 credits required for MS; 4 credits required for PhD.
f. **Graduate seminars in other departments—**1 credit required for MS; 2 credits required for PhD.
g. **Teaching experience (NFS 6900)—**2 credits required for PhD.
h. **Research (NFS 6970, 7970; assigned at discretion of the major professor)—**6-12 credits required for MS; approximately 30 credits required for PhD.

The PhD program includes 30 Master of Science credits. For more information, see the School of Graduate Studies requirements in this catalog.

5. Meet with Supervisory Committee. Before the first meeting of the supervisory committee, the student must complete the *Program of Study* form. A copy of the form and the research

proposal should be given to each committee member several days before the meeting. The purpose of this meeting is to:

a. Secure the committee's approval of the Program of Study. Deficiencies in academic background will be discussed and plans made to resolve them.
b. Obtain the committee's approval of the research plan.
c. Discuss regulated aspects of the research (hazardous materials, experimental animals, or human subjects).
d. Allow the committee to determine the topic areas of the NFS Graduate Examinations the student will be required to pass. These will be listed on the *Program of Study* form as other requirements of the program. All members of the committee and the department head must sign the *Program of Study* form before it is sent to the School of Graduate Studies.

6. Begin Research and Continue Courses. Students must take the approved courses and conduct the research as outlined in the approved research proposal.

7. Take Written NFS Graduate Examinations. NFS graduate examinations are held twice each semester, with three NFS topics offered each time. MS students must pass two examinations as designated by the committee. PhD students must pass four examinations, three of which are designated by the committee. Students may sit for these examinations throughout their program, but no examination topic may be attempted more than three times.

8. Take Oral Preliminary (MS) or Comprehensive (PhD) Examination. The examination is taken after passing the required NFS graduate examinations. The oral examination tests general knowledge that the student should have at this stage of academic training, as well as the student's ability to synthesize information in relation to nutrition and food science. Material to be included is determined by the committee, but emphasis is on knowledge applicable to the research.

9. Complete Application for Candidacy Forms. PhD candidates must submit the *Application for Candidacy* form to the School of Graduate Studies. It must be signed by all members of the committee at the end of the comprehensive examination, and then signed by the department head. This form must be received by the School of Graduate Studies at least three months before the dissertation defense.

10. Complete Research and Write Thesis or Dissertation.

11. Departmental Seminar. Each student must present a seminar in the department to report the results of his or her research. This must be done before the defense, and is typically given on the day of the defense.

12. Final Examination (Thesis or Dissertation Defense). When both the student and the major professor are satisfied that the thesis is editorially correct, copies are given to the members of the committee. This should be done several weeks before the examination. Students must realize that committee members will review the thesis only as their schedules permit. Students should plan adequate time for thesis review and revision before their defense, so as to meet the deadlines. The final examination is scheduled with the School of Graduate Studies. The signed appointment form must be submitted to the School of Graduate Studies at least five days before the defense, by all committee members, verifying that they have read the thesis or dissertation and it is ready to be defended at the scheduled day and time.

The dean of the School of Graduate Studies will appoint one committee member, usually from outside the department, to serve as chair of the final examination. The School of Graduate Studies will also provide forms to be signed by the committee and returned to the School of Graduate Studies at the end of the defense.

13. Submit Thesis or Dissertation. After all changes suggested during the defense have been made, the thesis or dissertation is submitted to the departmental thesis reviewer, who will check to ensure that the thesis is in the correct format. The thesis or dissertation is submitted to the School of Graduate Studies for review by the thesis coordinator only after all corrections suggested by the departmental reviewer have been made.

Financial Assistance

Some teaching assistantships and research fellowships and many research assistantships are available to graduate students in the Department of Nutrition and Food Sciences. Teaching assistantships are used to cover the teaching needs of the department. Research fellowships and research assistantships are available through individual faculty members. Most research assistantships are tied to specific research projects.

Career Opportunities

There is a continuing shortage of MS and PhD graduates in nutrition and food sciences. Many MS graduates go on to obtain a PhD, but all graduates have a wide choice of career opportunities.

Additional Information

Additional information and updates may be obtained by writing or telephoning the Department of Nutrition and Food Sciences directly or by checking out the departmental web page at: **http://www.usu.edu/~famlife/nfs/index.html**.

Graduation requirements described in this catalog are subject to change. Students should check with the Department of Nutrition and Food Sciences concerning possible changes.

Nutrition and Food Sciences Courses (NFS)

1000. World of Food and Nutrition. Weekly seminars present and discuss current issues in food, diet, and health. Presentations about food safety and regulations, food processing, and food technologies, with orientation to programs in the Department of Nutrition and Food Sciences. (1F)

BLS 1020. Science and Application of Human Nutrition. Role of dietary choices in providing nutrients and their relationship to the social, mental, and physical well-being of people. How to evaluate nutritional status. Influences on nutrient needs throughout life. (3F,Sp,Su)

1240. Culinary Basics. Develops fundamental skills specific to culinary arts. Investigates principles of ingredients and preparation methods. Practice provided in knife skills and cooking methods. Explores variations in heat, cooking methods, and pH, and their effect on color, flavor, and texture of foods. (3F,Sp)

1250. Sanitation and Safety. Principles of sanitation and safety applied to food operations. Emphasizes personal hygiene habits and food handling practices that protect the health and safety of employees and consumers. (2Sp)

2020. Nutrition Throughout the Life Cycle. Application of nutrition principles to the human life cycle: nutrient functions, needs, sources, and alterations during pregnancy, lactation, growth, development, maturation, and aging. Prerequisites: NFS 1020; Biol 2000 (may be taken concurrently). (3F)

2030. Beginning Culinary Food Preparation. Essential cooking techniques, including stocks, soups, meats, poultry, fish, grains, starches, and pantry foods. Evaluation of the quality of the finished product. NFS 2030 and 2050 must be taken in sequence. Prerequisites: NFS 1240 and 1250. (5F)

2050. Advanced Culinary Food Preparation. Essential cooking techniques, including stocks, soups, meats, poultry, fish, grains, starches, and pantry foods. Evaluation of the quality of the finished product. NFS 2030 and 2050 must be taken in sequence. Prerequisites: NFS 1240, 1250, and 2030. (5Sp)

2250. Food Preparation and Meal Management. Emphasizes ingredient and preparation methods for optimum food products. Planning, preparing, and serving family meals with consideration of the nutritional profile, aesthetics, cost factors, service styles, and time management in meal preparation. (3F)

3000. Beginning Baking. Introduction to theories and techniques of baking. Focuses on yeast dough production and basic desserts. Prerequisites: NFS 1240, 2030, 2050. (4F)

3020. Nutrition Related to Fitness and Sport. Includes information on macro/micronutrient metabolism during exercise, specific problems experienced by athletes or highly active persons, myths, ergogenic aids, and current interests. (2Sp)

3030. Advanced Baking. Focuses on pastry, advanced dessert preparation and presentation, and related topics. Prerequisite: NFS 3000. (4Sp)

3060. Garde-Manger. Emphasizes cold food preparation, presentation techniques, food displays, and meat fabrication. Prerequisite: NFS 2050. (4F)

QI 3100. Sensory Evaluation of Food. Design and implementation of sensory testing of foods. Emphasizes physiology of senses, testing methods, statistical analysis, and taste panel experience. Prerequisite: Stat 3000. (3Sp)

3110. Food Technology and Health. Impact of food technology on food spoilage, food preservation, food quality, and foodborne diseases. Basic processing operations and regulations ensuring a safe food supply. Prerequisite: NFS 1020. (3F)

3250. Occupational Experience in Nutrition and Food Sciences. On-the-job training. (1-3F,Sp,Su) ®

3500. Beverage Management. Studies in selection and service of beverages for the food service industry. Issues addressed include equipping, staffing, operating, marketing, and purchasing beverages. Addresses issues of responsible alcohol service. (2Sp)

3510. Purchasing and Procurement in Food Service. Overview of selection and acquisition processes regarding products and services related to the food service industry. (3Sp)

4020. Advanced Nutrition. Structures, properties, and metabolism of protein, lipids, carbohydrates, vitamins, and minerals. Includes digestion, absorption, hormonal control, cellular biochemistry, metabolic interrelationships, excretion, etc. Prerequisites: NFS 1020, Chem 3700, Biol 2000. (3F)

4030. Advanced Nutrition Applications. Applications of metabolism of protein, lipids, carbohydrates, vitamins, and minerals. Must be taken concurrently with NFS 4020. (1F)

4050. Education and Counseling Methods in Dietetics I. Principles of education, counseling, and communication as applied to the field of nutrition education and clinical dietetics practice. (2F)

4060. Education and Counseling Methods in Dietetics II. Continuation of NFS 4050. Prerequisite: NFS 4050. (2Sp)

4070. Experimental Foods. Science principles underlying modern food theory and practice. Relation of physical and chemical properties of food components and their systems to food preparation. Prerequisite: Chem 1120 or 2300. (4Sp)

4250. Internship in Culinary Arts/Food Service Management. Internship experience in various food service settings. Specific locations and durations to be arranged by instructor. Prerequisite: Junior standing or above. (2-5F,Sp,Su)

4420. Nutrition Research Methodology. Development of experimental design, data collection, statistical analysis, interpretation, and presentation of results. Clinical, community, and management data analysis. Interpretation and presentation, including bench marking, cost/benefit analysis, and continuous quality improvement projects. Enrollment limited to seniors within the Nutrition and Food Sciences major. Prerequisites: Stat 1040, Math 1050. (2Sp)

QI 4440. Fundamentals of Food Processing. Engineering concepts taught in a fundamental sense and applied to food processing. Concepts include: general problem solving techniques, material and energy balances, fluid dynamics, heat transfer, refrigeration, and kinetics of common biological processes used in food preparation. (4F)

4480. Community Nutrition. Introduction to public health nutrition, food programs, and national nutrition monitoring. (3F)

4540. Nutrition Assessment. Introduction to the profession of dietetics, assessment of nutritional status, and provision of nutritional care. Prerequisite: Acceptance into dietetics program or junior standing in nutrition science. (3F)

4550. Clinical Nutrition I. Biochemical and physiological abnormalities in disease. Medical treatment of disease. Role of medical nutrition therapy. Prerequisites: NFS 4540, Chem 3700. (2F)

4560. Clinical Nutrition II. Continuation of NFS 4550. Prerequisite: NFS 4550. (4Sp)

4570. Clinical Nutrition Experience I. Practical experience in health care facilities. Integration and application of material learned in NFS 4550. To be taken concurrently with NFS 4550. (1F)

4580. Clinical Nutrition Experience II. Continution of NFS 4570. To be taken concurrently with NFS 4560. Prerequisite: NFS 4570. (2Sp)

CI 4660. Medical Dietetics. In-depth study of nutrition relationships in disease development and treatment with clinical experience in medical facilities in Salt Lake City. Prerequisites: NFS 4540, 4550, 4560, 4570, 4580. (12F)

4710. Quantity Food Preparation. Principles of food preparation applied to large quantity production, menu planning, food selection, storage, and equipment. Prerequisite: NFS 4070 or consent of instructor. (2F)

4720. Food Service Organization and Management. Principles of organization, management theory, financial controls, human and labor relations, employee training, layout, and sanitation. Prerequisites: NFS 4710 and 4730 or senior-level standing in CA/FSM Program. (2Sp)

4730. Quantity Food Preparation Lab. Practical experience in quantity food preparation. Integration and application of NFS 4710. To be taken concurrently with NFS 4710. (2F)

4740. Food Service Organization and Management Lab. Practical experience in food service management. Integration and application of NFS 4720. To be taken concurrently with NFS 4720. (2Sp)

4750. Management of Dietetics. Principles of management in dietetics and current practice issues. Prerequisite: NFS 4660. (3Sp)

CI 4780. Maternal and Child Nutrition. Normal and clinical nutritional requirements in pregnancy, lactation, and pediatrics. To be taken in Salt Lake City in conjunction with NFS 4660. (4F)

4810. History and Practices in World Cuisines. Preparation of foods from around the world, incorporating historical and current food trends. Prerequisites: NFS 3030 and 3060. (4Sp)

4840. Menu Design. Menu writing and merchandising based on budget, customer satisfaction, kitchen capacity, personnel skills, and size of facility. (1Sp)

4850. Topics in Food Service Facilities Management. Overview of related topics in food service management. Topics include catering, dining room service, equipment management, and facility design. Prerequisite: NFS 2050 or consent of instructor. (3F)

4900. Special Problems. Individual problems and research problems for upper-division students in Nutrition and Food Sciences. (1-4F,Sp,Su)

CI 4920. Food Technology II, Capstone Course. Capstone course that incorporates and unifies the principles of food chemistry, microbiology, engineering, processing, nutrition, sensory analysis, and statistics. Prerequisite: Senior standing. (3F)

4990. Nutrition and Food Sciences Seminar. Senior student paper and presentation on current topics in nutrition and food sciences. Prerequisite: Senior in NFS. (1Sp)

5020 (d6020).[1] Meat Technology and Processing. Emphasizes understanding the conversion of muscle to meat, fabrication of carcasses into primal and retail cuts, and principles underlying manufacture of processed meats. (4F)

5030 (d6030). Dairy Technology and Processing. Processing milk into fluid milk products, cheeses, ice cream, yogurt, concentrated milks, and powders. Identity standards of regulated dairy products. Physical, chemical, and biochemical changes that occur during manufacture and storage. Microbiological, chemical, and physical deterioration and control. (4F)

CI 5110 (d6110). Food Microbiology. Microorganisms in food spoilage, poisoning, preservation, and sanitation. Prerequisite: Biol 3300. (4Sp)

QI 5120 (d6120). Biologic Markers of Diet and Disease Risk Lab. Measurement and interpretation of biologic markers of nutritional status and disease risk. Markers measured in a variety of human tissues. Prerequisites: NFS 1020, Biol 2000, Chem 3700, Math 1210, and Stat 3000. (2Sp)

5160. Methods in Biotechnology: Cell Culture. Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. (3Sp)

5200 (d6200). Nutritional Epidemiology. Introduction to epidemiologic methods and their application to the study of nutrition, human health, and disease. Useful for students with career interests in nutrition, food sciences, dietetics, human health sciences, veterinary sciences, biology, public health, anthropology, social work, and public policy. (2Sp)

5210 (d6210). Public Health Nutrition. Effects of diet on development and prevention of disease. Conditions of public health significance, including birth defects, coronary heart disease, hypertension, stroke, Alzheimer's disease and other causes of dementia, cancer, osteoporosis, diabetes, and international health problems. Discussion of health concerns of minority populations, cross-cultural studies, government policy, and establishment of dietary recommendations. (2Sp)

5220 (d6220). Endocrine Aspects of Nutrition. Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/presentations. Prerequisites: Chem 3700 and NFS 4020, or consent of instructor. (2F)

5240. Methods in Biotechnology: Protein Purification Techniques. Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: Chem 3700. (3Sp)

5250. Occupational Experiences in Nutrition and Food Sciences. On-the-job training. (1-3F,Sp,Su)

5260. Methods in Biotechnology: Molecular Cloning. Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: Chem 3700 or Biol 2200; or permission of instructor. (3)

5300 (d6300). Advanced Micronutrient Nutrition. Evolution of micronutrient and application in human health and disease. Prerequisite: NFS 4020. (3Sp)

****5400. Nutrition Update: Present Knowledge.** Enriches and updates knowledge of nutrition, as well as implications for well-being of people, through presentation of recent advances in nutrition accomplished by worldwide research efforts of scientists from academia, government, and industry. Available only through Continuing Education Independent Study Division. (2) ©

QI 5500 (d6500). Food Analysis. Application and theory of physical, chemical, and instrumental techniques for determination of composition and quality of food. Prerequisite: NFS 5560/6560. (4Sp)

5510 (d6510). Food Laws and Regulations. Provides background of federal/state laws and regulations and case law history affecting food production, processing, packaging, marketing, and distribution of food products. (2Sp)

5560 (d6560). Food Chemistry. Chemical structure, properties, and reactions and interactions of the important chemical constituents of food. Prerequisites: Chem 3700 and 3710. (4F)

5610 (d6610). Food and Bioprocess Engineering. Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. (3F)

5630 (d6630). Nutrition in Aging. Theories of aging and nutrition, as affected by physiologic and metabolic changes. Nutritional requirements and assessment of elderly persons. Implications for nutritional programs, policies, research, and education. Prerequisites: NFS 2020, Biol 3300, Chem 3700. (2Sp)

5750 (d6750). Advanced Dietetics Practicum. Advanced dietetics practicum in clinical nutrition, community nutrition, food service management, or research. Prerequisite: NFS 4660 or RD. (1-6F,Sp,Su)

5760. Senior Practicum in Culinary Arts/Food Service Management. Practical experience in food service settings, integrating and applying material learned in lectures and laboratories. (1-5F,Sp) ®

6020 (d5020). Meat Technology and Processing. Emphasizes understanding the conversion of muscle to meat, fabrication of carcasses into primal and retail cuts, and principles underlying manufacture of processed meats. (4F)

6030 (d5030). Dairy Technology and Processing. Processing milk into fluid milk products, cheeses, ice cream, yogurt, concentrated milks, and powders. Identity standards of regulated dairy products. Physical, chemical, and biochemical changes that occur during manufacture and storage. Microbiological, chemical, and physical deterioration and control. (4F)

6100. Sensory Evaluation of Foods. Methods and practice in the sensory evaluation of foods. Testing facilities/environment, statistical design, testing method selection, and data interpretation. Prerequisite: Stat 3000 or permission of instructor. (3Sp)

6110 (d5110). Food Microbiology. Microorganisms in food spoilage, poisoning, preservation, and sanitation. Prerequisite: Biol 3300. (4Sp)

6120 (d5120). Biologic Markers of Diet and Disease Risk Lab. Measurement and interpretation of biologic markers of nutritional status and disease risk. Markers measured in a variety of human tissues. Prerequisites: NFS 1020, Biol 2000, Chem 3700, Math 1210, and Stat 3000. (2Sp)

6140. Biotechnology of Lactic Starter Cultures. Examination of genetics and microbiology of lactic starter cultures, emphasizing application of biotechnology in strain improvement and design. Prerequisites: Biol 3300, Chem 5700. (2Sp)

6150. Microbiology of Dairy Foods. Information about microorganisms associated with raw and processed milk. Discussion of new microbial identification techniques used for lactic acid bacteria. Prerequisite: Biol 3300. (3F)

6200 (d5200). Nutritional Epidemiology. Introduction to epidemiologic methods and their application to the study of nutrition, human health, and disease. Useful for students with career interests in nutrition, food sciences, dietetics, human health sciences, veterinary sciences, biology, public health, anthropology, social work, and public policy. (2Sp)

6210 (d5210). Public Health Nutrition. Effects of diet on development and prevention of disease. Conditions of public health significance, including birth defects, coronary heart disease, hypertension, stroke, Alzheimer's disease and other causes of dementia, cancer, osteoporosis, diabetes, and international health problems. Discussion of health concerns of minority populations, cross-cultural studies, government policy, and establishment of dietary recommendations. (2Sp)

6220 (d5220). Endocrine Aspects of Nutrition. Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/presentations. Prerequisites: Chem 3700 and NFS 4020, or consent of instructor. (2F)

6300 (d5300). Advanced Micronutrient Nutrition. Evolution of micronutrient and application in human health and disease. Prerequisite: NFS 4020. (3Sp)

6450. Meat Science. Structure of muscle tissue, chemistry of contraction and relaxation, factors affecting meat tenderness, and postmortem changes and their effect on meat quality. Prerequisite: Chem 3700. (3Su)

6500 (d5500). Food Analysis. Application and theory of physical, chemical, and instrumental techniques for determination of composition and quality of food. Prerequisite: NFS 6560/5560. (4Sp)

6510 (d5510). Food Laws and Regulations. Provides background of federal/state laws and regulations and case law history affecting food production, processing, packaging, marketing, and distribution of food products. (2Sp)

6560 (d5560). Food Chemistry. Chemical structure, properties, and reactions and interactions of the important chemical constituents of food. Prerequisites: Chem 3700 and 3710. (4F)

****6600. Food Proteins and Enzymes.** Protein structure, folding, and purification; enzyme classification and nomenclature; reaction kinetics; and immobilization technology as applicable to food science. (3F)

6610 (d5610). Food and Bioprocess Engineering. Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. (3F)

6630 (d5630). Nutrition in Aging. Theories of aging and nutrition, as affected by physiologic and metabolic changes. Nutritional requirements and assessment of elderly persons. Implications for nutritional programs, policies, research, and education. Prerequisites: NFS 2020, Biol 2000, Chem 3700. (2Sp)

6750 (d5750). Advanced Dietetics Practicum. Advanced dietetics practicum in clinical nutrition, community nutrition, food service management, or research. Prerequisite: NFS 4660 or RD. (1-6F,Sp,Su)

6760. Special Topics in Food Science. Selected topics in food science, based on individual faculty interests. (1-3F,Sp,Su)

6770. Special Topics in Nutrition. Study of selected topics in nutrition, including reports on current advances and presentation of nutrition support topics (case studies) developed through research. (2F,Su)

6900. Special Problems. Individual problems and research problems for upper-division students in Nutrition and Food Sciences. (1-4F,Sp,Su)

6970. Thesis Research. For students working on MS research. (1-12F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

****7700. Dairy Chemistry.** Chemical structure, properties, biosysnthesis, and reactions of the main constituents in milk. Application of this knowledge in the development and processing of foods. (2F)

7800. Seminar. Reports and discussion on research and current literature. (1F,Sp)

7970. Dissertation Research. For students working on PhD research. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Physics

College of Science

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Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Physics

Undergraduate emphases: *BS*–Professional Emphasis or Applied Emphasis; **Graduate specializations:** *MS*–Upper Atmospheric Physics; *PhD*–Atomic Physics, Electromagnetic Theory, Medium Energy Nuclear Physics, Space Science, Surface Physics, and Theoretical Physics

Undergraduate Programs

Objectives

The Physics Department embraces undergraduate students from all quarters of the University—in introductory courses required for majors by various departments, in courses for more general audiences that are part of the University Studies Program, and in upper-level courses designed primarily to fulfill bachelor's degree requirements in Physics. These courses, and the degree programs offered, are strongly impacted by the department's central goals:

1. to communicate the beauty and utility of the fundamental principles of the physical universe and the power of describing nature in quantitative terms,
2. to create new knowledge,
3. to foster critical and creative thinking,
4. to enhance the ability of citizens to participate in a technological democracy,
5. to assist in the preparation of elementary and secondary school teachers,
6. to provide opportunities for students to sharpen their communication and interpersonal skills, and
7. to develop new tools and texts to improve physics pedagogy.

The degree programs of the department are constructed to be rigorous, yet flexible, and are intended to help students prepare for careers in academia, government and industrial laboratories, medicine, law, teaching, and business. Required course and laboratory work in these programs carefully balances theory and experiment. Because the department believes that one must participate in discovery to understand science, undergraduates are encouraged to engage in departmental research early in their studies, and a formal research experience is integral to most departmental programs. The department's Get Away Special activities provide excellent opportunities for students of all backgrounds to participate in space related research.

Requirements

Departmental Admission and Graduation Requirements. New freshmen admitted to USU in good standing qualify for admission to the degree programs in Physics. Admission in good standing for students transferring from another institution requires

a minimum transfer GPA of 2.2, while students transferring from another USU major are required to have a minimum total GPA of 2.0. Students wishing to complete the Teaching Major in Physics must apply for admission to the Secondary Education program as well. Requirements for admission to the **Professional Education Framework for Secondary Teacher Preparation** include a minimum GPA of 2.75 in either Phyx 2110 and 2120, or Phyx 2210 and 2220; and at least 60 total credits completed with a minimum GPA of 2.75. A Composite Teaching Major in Physical Science is available through either the Physics or the Chemistry and Biochemistry departments. Students applying for admission to the Professional Education Framework with the Composite major must satisfy the latter requirements, plus a minimum GPA of 2.75 in Chem 1210, 1220, 1230, and 1240.

Students may use no more than one course with the *P-D-F* option to satisfy a major or minor requirement in Physics. All other courses used to satisfy major or minor requirements must be completed with at least a *C*- grade, and the total GPA in all required Physics courses must be at least 2.3. The Teaching Major and Teaching Minor in Physics and the Composite Teaching Major in Physical Science require a 2.75 minimum GPA in Physics courses and a minimum 2.75 overall GPA for graduation.

College of Science Requirements. The College of Science requires a year of mathematics (8 credits) and a year sequence in science (6-8 credits) for all of its majors. For Physics majors, the College of Science requirements are Math 1210 and 1220; and one of the following pairs of courses: Biol 1210 and 1220, Chem 1210 and 1220, or Geol 1150 and 3200.

Bachelor's Degrees and Core Requirements. The Physics Department awards the following degrees: BS in Physics, BA in Physics, BS in Physics with a Professional Emphasis, BS in Physics with an Applied Emphasis, BS in Mathematics and Physics Double Major Option, BS in Physics Teaching, and BS in Composite Teaching–Physical Science.

Except for the two Teaching Majors, all degrees require a **common core**: College of Science requirements; Math 2210; Phyx 2210 and 2220 (preferred) or Phyx 2110 and 2120; Phyx 2710, 3550, 3600, 3870, and 4900. The specific requirements beyond this core for the various bachelor degrees are:

1. Bachelor of Science in Physics: Math 2250; Phyx 3650 or 3700; 8 credits in Physics at the 3500 level and above (excluding USU Depth courses).

2. Bachelor of Arts in Physics: University language requirements; Math 2250; 6 credits in Physics at the 3500 level and above (excluding USU Depth courses); Phil 4310, 4320.

3. Bachelor of Science in Physics with a Professional Emphasis: Math 2250; Phyx 3650, 3700, 3750, 3880, 4550, 4600, 4700, 4710, 5870.

4. Bachelor of Science in Physics with an Applied Emphasis: Math 2250; Phyx 3650, 3700, 3880; 12 credits in other technical departments at the 3000 level or above (excluding USU Depth courses). The latter courses must have a coherent theme and must be approved by the Physics adviser.

5. Mathematics and Physics Double Major Option: Math 2250 (or 2270), 2280, 4200, 4310, 5210, 5710; 6 credits in Mathematics above the 4600 level; Phyx 3650 or 3700; 8 credits in Physics at the 3500 level and above (excluding USU Depth courses).

Minor in Physics. Majors in other departments may obtain a minor in Physics by successfully completing Phyx 2110 and 2120, or Phyx 2210 and 2220; plus 10 additional credits in Physics chosen from Phyx 2710 and/or courses above the 3000 level (including USU Depth courses). Note that Math 1100 or 1210 is a prerequisite for Phyx 2110, Math 1210 is a prerequisite for Phyx 2210, and Math 1220 is a prerequisite for Phyx 2710.

Bachelor of Science in Physics Teaching. Courses required for the Bachelor of Science in Physics Teaching are: College of Science requirements; Math 1210, 1220, 2250; Stat 3000; Phyx 2210 and 2220 (preferred) or Phyx 2110 and 2120; Phyx 1000, 2710, 3550, 3870; 5 credits in Physics above the 3000 level (including USU Depth courses); Sci 4300; and 6 credits in science, with 3 in each of the two areas not covered by the College of Science science sequence requirement. Students seeking this degree must complete the requirements for the **Professional Education Framework for Secondary Teacher Preparation**.

Teaching Minor in Physics. Students who complete the Professional Education Framework for Secondary Teacher Preparation are eligible to obtain a Teaching Minor in Physics by successfully completing Phyx 2110 and 2120, or Phyx 2210 and 2220; Phyx 1000; 6 additional credits in Physics chosen from Phyx 2710 and/or courses above the 3000 level (including USU Depth courses); Sci 4300 or, if Sci 4300 is required by the student's major, 2 credits in science (not including Physics) not required by the major. Note that Math 1100 or 1210 is a prerequisite for Phyx 2110, Math 1210 is a prerequisite for Phyx 2210, and Math 1220 is a prerequisite for Phyx 2710.

Bachelor of Science in Composite Teaching–Physical Science. Courses required for the Bachelor of Science in Composite Teaching–Physical Science are: Math 1210, 1220; Stat 3000; Phyx 2210 and 2220 (preferred), or Phyx 2110 and 2120; Phyx 1000, 1030 or 3030; 5 credits in Physics from Phyx 2710 or courses above the 3000 level (including USU Depth courses); Chem 1210, 1220, 1230, 1240, 2300 or 2310, 2330; Biol 1010; Geol 1150; Bmet 2000; and Sci 4300. Students seeking this degree must complete the requirements for the **Professional Education Framework for Secondary Teacher Preparation**.

Additional Information

Information concerning degree programs, recommended schedules of courses, career opportunities, and opportunities to participate in the Get Away Special activities and in other areas of undergraduate research may be obtained by consulting the Physics adviser in SER 250. Also see the Department's Web page at http://www.physics.usu.edu/.

Financial Support

The Physics Department has several small scholarship funds available for physics majors with excellent academic records. In addition, there are a number of Get Away Special (GAS) scholarships for students interested in designing and constructing experiments to be flown on the Space Shuttle and in participating in other GAS activities. Inquiries should be made with the Physics adviser in SER 250.

Graduate Programs

Admission Requirements

In addition to the general requirements for admission established by the School of Graduate Studies (see pages 60-61), the department admission committee bases its decisions for offering admission on the following criteria: review of applicants' undergraduate records, letters of recommendation, performance in graduate courses (if any), performance in research (if any), and scores on the General and Advanced Physics portions of the Graduate Record Examination. The latter is required of all applicants, except for those applying to work toward the MS Upper Atmospheric Physics Specialization. Students whose native language is not English are strongly encouraged to submit to the School of Graduate Studies results of the Test of Spoken English (TSE). Regardless, nonnative English speakers must submit a score for the Test of English as a Foreign Language (TOEFL). If a satisfactory score on the TSE is not provided, such students will be required to take a test given by the Intensive English Language Institute (IELI) at USU. The purpose of this test is to guide the selection of remedial language courses, if needed, to help with physics coursework comprehension. (See also *Financial Assistance*, below.)

Qualification Requirements

Each student will be evaluated for qualification for an advanced degree early in the third semester after beginning graduate work at USU. Evaluation will be based, in part, on the student's Advanced Physics GRE score (except for students in the MS Upper Atmospheric Physics Specialization) and, in part, on the student's performance in graduate coursework at USU. Other factors, such as performance as a teaching assistant or performance in research, may also be weighed in the evaluation. Three outcomes are possible: qualification at the PhD level, qualification at the MS level, and no qualification. Students seeking the PhD degree must qualify at the PhD level. Students seeking an MS may qualify at either the PhD or MS level. One additional attempt at qualifying at the desired level is permitted, if the attempt is made no later than the end of the fourth semester after beginning graduate work at USU. Summer semesters are not counted. Details concerning the normal expectations for qualification may be obtained from the Physics adviser in SER 250.

Degree Programs

Master of Science. In addition to the above general requirements, MS students must complete any four courses from Phyx 6010, 6110, 6120, 6210, 6220, and 6410. The student must also submit and orally defend either a thesis (Plan A) or a research report (Plan B) at the discretion of the student's supervisory committee. Plan A and Plan B MS candidates must present a colloquium to the department on the research topic during the time the thesis or research report is being written. The department also accepts Plan C, which has no research component. For Plan C, the student must complete 33 credits of graduate-level classwork, the composition of which shall include the required courses listed above. In addition, the student must present a seminar and a paper to his or her supervisory committee on a topic related to educational or managerial aspects of physics graduate education, which is chosen by his or her supervisory committee.

Master of Science (Upper Atmospheric Physics Specialization). The department offers a specialization in Upper Atmospheric Physics for MS students. This degree is a Plan A MS. In consultation with his or her adviser, the student selects a minimum of 18 credits of classwork from the following courses: Phyx 4600, 6240, 6310, 6320, 6330, 6340, 6360, 7210, 7500; 3 to 6 additional credits may be chosen from courses in electrical engineering, computer science, mathematics, and biometeorology. The student may gain from 6 to 12 credits by research, to be written up as a thesis that must be defended orally. In addition, the student must present a colloquium on the topic of his or her research.

Doctor of Philosophy. In addition to the general requirements, the PhD student is required to complete Phyx 6010, 6110, 6120, 6210, 6220, and 6410. These courses must be completed no more than one year after PhD qualification. The student must also take a written and oral graduate comprehensive examination set by the department. The examination includes graduate-level questions drawn from the above courses. The graduate comprehensive examination is normally taken no later than the beginning of the third year of graduate study.

The student must also complete a research dissertation and give an oral defense of the dissertation. Furthermore, the PhD candidate is expected to give two colloquia to the department. The first of these will normally be given at the time of submission of the research proposal, with the other given at the time the dissertation is completed.

Research

Space Science. The Physics Department is active in the field of atmospheric and space science. Physics faculty channel their research through the interdisciplinary Center for Atmospheric and Space Sciences or the Space Dynamics Laboratory. Atmospheric and space science involves many areas of physics, in addition to such disciplines as engineering, chemistry, and meteorology. At USU, these groups enjoy a strong cooperative relationship and, as a result, the atmospheric and space science program has flourished for many years. Once the departmental requirements have been met, students may select courses from the offerings of the associated departments suited for their particular interests and needs while they gain research experience on challenging problems in atmospheric and space science. Opportunities are available for students in both experimental and theoretical projects. These include participation in instrument development and data analysis related to rocket, satellite, and space shuttle projects and projects in experimental design and data analysis related to incoherent-scatter and coherent radars and ground-based optical instruments including a LIDAR system. Opportunities also exist in theoretical modeling of physical processes occurring in both the neutral atmosphere and in the plasma in the solar-terrestrial environment.

Atomic and Molecular Physics. Atomic and molecular processes that contribute to the infrared emissions associated with the terrestrial airglow and aurorae are currently being studied by means of FTIR spectroscopic methods. In selected cases, pertinent complementary laboratory investigations of excitation (electron and/or heavy particle impact) and deexcitation (radiative and collisional) processes have been conducted.

Electromagnetic Theory. The study of perfect conductors in the presence of magnetic fields has interesting applications to

space plasmas, and illuminates certain properties of quantum fluids such as superconductors. Using minimum energy principles, researchers attempt to model magnetic structures such as flux ropes near Venus, filaments in the solar corona, and fluxoids in super conductors.

Surface Physics. The surface physics group has an active experimental research program studying the structure, growth, dynamics, electronic properties, and optical properties of surfaces, interfaces, and adsorbed layers. The group has expertise in the interactions of electrons, ions, and photons with materials. Experimental techniques used within the group include atomic force microscopy (AFM), Auger electron spectroscopy (AES), infrared spectroscopy, ion scattering spectroscopy, ion implantation, low-energy electron diffraction (LEED), photoemission spectroscopy, scanning electron microscopy (SEM), scanning tunneling microscopy (STM), secondary ion mass spectroscopy (SIMS), thermal deflection spectroscopy, ultrafast femtosecond laser spectroscopy, vapor pressure adsorption isotherms, and x-ray diffraction. This interdisciplinary research brings together the fields of solid-state physics, surface physics and chemistry, optics, physical chemistry, and electrochemistry through active collaborations between Physics, Chemistry and Biochemistry, Mechanical and Aerospace Engineering, and other departments. It includes both basic and applied research.

Theoretical Physics. The department maintains an active research program in theoretical physics via its Field Theory Group. The principal focus of this group is on unified field theories, gravitational theory, classical and quantum field theory, and geometric methods in mathematical physics. Current research projects include: conformal and scale invariant gravity theories and unified field theories, Weyl-geometric quantization, exact solutions in Gauss-Bonnet extended gravity, classical and quantum dynamics of the gravitational field, symmetries and conservation laws in relativistic field theories, Lagrangian and Hamiltonian formulation of field theory, and application of geometrical methods in physics. Weekly seminars and ongoing collaborations with members of the USU Mathematics and Statistics Department and the University of Utah Physics Department provide an active research environment that allows for substantial interaction between students and faculty.

Nuclear and Particle Physics. Experimental research into nuclear and particle physics is conducted using national facilities providing high-intensity and high-energy beams at such places as LAMPF in Los Alamos, New Mexico, and TRIUMF in Vancouver. Recent work includes the study of exotic nuclei with large excesses of neutrons over protons or vice versa. Collaborating with scientists at these facilities, as well as from other institutions, it has been possible to determine the masses of these exotic, rare isotopes and certain properties of their decay. The purpose of the study is to further the fundamental understanding of the nucleus and the hadronic force, as well as to provide systematic information useful to other researchers, including those working on astrophysics problems. Worldwide, there is much interest in the construction and development of new research facilities utilizing radioactive nuclear beams. USU researchers are participating in the development of these beams and the detectors associated with them. They are also participating in the construction of a helium jet system for inputting exotic particles into the beam to be accelerated. The researchers are also interested in fundamental theoretical problems associated with the experimental discoveries being made.

Physics Education. The USU Physics Department is engaged in the study of how to improve the teaching and learning of physics. The program currently emphasizes introductory and general education courses and involves development of hands-on, inquiry-based curricula for lecture and laboratory, development of associated laboratory and multimedia equipment and modules, preparation of new texts and workbooks, sponsorship of undergraduate research, and outreach to the pre-college community. Faculty research in this area is currently funded by the National Science Foundation and the Department of Education.

Complex Materials and Dynamics. Current work at USU in the interdisciplinary area of complex systems includes theoretical and experimental studies of the physical properties of granular materials, development of new data analysis techniques for uncovering evidence for determinism in erratic signals, and identification and implementation of perturbative methods for controlling complex behavior in electrical circuits, spatially extended systems (such as flames), and in wildlife populations.

Financial Assistance

Financial assistance in the form of teaching assistantships and fellowships is awarded by the department. Research assistantships are available from research groups or individuals. Some support for teaching laboratory sections or grading papers is available. To be eligible for a teaching assistantship (TA), a student must successfully complete a graduate TA workshop. Nonnative English-speaking students must pass a test of spoken English (or submit a satisfactory TSE score) administered by the Intensive English Language Institute before being admitted to the TA workshop.

Career Opportunities

Master's degree holders in physics are generally employed by industrial or government laboratories as either physicists or engineers. Some are hired as teachers by high schools and by two-year colleges. Holders of the PhD in physics will generally be hired as research and development physicists by industrial or government laboratories and as professors in universities (though usually only following an appointment as a postdoctoral fellow for one to three years).

Additional Information

Regularly updated information about Physics Department activities and programs may be obtained via the Web at http://www.physics.usu.edu/.

Physics Courses (Phyx)

BPS 1000. Introductory Astronomy. Descriptive introduction to the night sky, including planets and stars. Features observations and hands-on demonstrations with models. Facility with high school mathematics is expected. (3F)

1020. Energy. Study of energy resources, utilization, conversion, and conservation, including energy balance and flow in biological and geological systems. Social impacts of energy resource development, including public policy and planning. Cannot be taken for University Studies (General Education) credit. Prerequisites: At least one university-level mathematics or statistics course, and completion of computer and information literacy examination. (3Sp)

1030. Intelligent Life in the Universe. Study of the likelihood of extraterrestrial intelligence and its probable locations. Nature and evolution of life on Earth, as well as stellar evolution and planetary environments. Discussion of psychology of UFO phenomena. Cannot be taken for University Studies (General Education) credit. Prerequisites: At least one university-level mathematics or statistics course, and completion of computer and information literacy examination. (3Sp)

1040. From Atoms to Ants. Examines structure and organization of matter, from the small to the large, and inquires into how such seemingly nonphysical phenomena as living, social, and mental activity may be related to the behavior of the atom. Extensive use of computer simulations to explore aspects of the material. Knowledge of programming not required. Cannot be taken for University Studies (General Education) credit. Prerequisites: At least one university-level mathematics or statistics course, and completion of computer and information literacy examination. (3F)

BPS 1100. Great Ideas in Physics. Descriptive introduction to the principles underlying contemporary physics. Great ideas will include relativity and quantum mechanics and such consequences and applications as the twin paradox, black holes, nuclear energy, magnetic imaging, lasers, superconductivity, and the paradox of Schrodinger's cat. Facility with high school algebra is expected. (3F)

BPS 1200. Introduction to Physics by Hands-on Exploration. Explores structure of matter, electricity and magnetism, light, and sound through hands-on, inquiry-based activities. Facility with high school algebra is expected. Required laboratory. (4F,Sp,Su)

1800. Physics of Technology. Overview of the classical physics on which industrial technology is based. Elements of kinematics, forces, energy, momentum, thermodynamics, electric and magnetic fields, waves, and optics. Required laboratory. Prerequisites: Math 1050 and 1060. (4Sp)

2110. The Physics of Living Systems I. Study of kinematics and dynamics of particles and systems of particles. Introduction to Newton's Laws of motion, momentum and energy conservation, rotations, and thermodynamics, with applications in biology and biotechnology. Required recitation and lab. Prerequisite: Math 1100 or 1210. (4F,Su)

BPS 2120. The Physics of Living Systems II. Introduction to electromagnetism, optics, and quantum phenomena—including the microscopic structure of matter, with applications in biology and biotechnology. Required recitation and lab. Prerequisite: Math 1100 or 1210, Phyx 2110. (4Sp,Su)

2200. Elements of Mechanics. Calculus-based introduction to particle mechanics. Kinematics, Newton's laws of motion, momentum, work and energy, and angular momentum. Required recitation and lab. Prerequisite: Math 1210. (2F,Sp,Su)

QI 2210. General Physics—Science and Engineering I. Calculus-based introduction to Newton's Laws of motion, momentum and energy conservation, rotations, oscillations, and thermodynamics, with applications in the physical sciences and technology. Required recitation and lab. Prerequisite: Math 1210. (4F,Sp,Su)

QI 2220. General Physics—Science and Engineering II. Calculus-based introduction to electromagnetism, waves, optics, and modern physics, with applications in the physical sciences and technology. Required recitation and lab. Prerequisites: Math 1210; Phyx 2200 or 2210, *or* a minimum score of 4 on the AP B exam, *or* a minimum score of 3 on the AP C (mechanics) exam. (4F,Sp,Su)

2710. Introductory Modern Physics. Overview of modern physics at the intermediate level. Focuses on principles and applications of relativity and quantum mechanics, including a discussion of atomic, solid state, and particle physics. Required laboratory. Prerequisites: Math 1220, Phyx 2120 or 2220. (4Sp)

QI, DSC 3010. Space Exploration from Earth to the Solar System. Comparative introduction to the Earth and other planets in our solar system, including geological structure and atmosphere. Emphasis on space exploration methods, including spacecraft and detection instrumentation. Examines latest results of Mars missions, Jupiter and Saturn exploration, etc. Prerequisite: Completion of quantitative literacy and physical sciences breadth. (3F)

DSC 3020. Great Scientists. Lives and work of men and women responsible for scientific revolution: Maxwell (loved children), Einstein (despised authority), Curie (suffered discrimination against women), Schrodinger (fled from Hitler), Watson and Crick (the DNA story), Feynman (lock picker), Rubin (as a young girl built her own telescope), and others. Prerequisite: USU 1310. (3F)

QI, DSC 3030. The Universe. Study of properties and origin of the universe, based on Einstein's theory of gravity. Topics include curved space-time; black holes, white holes, and worm holes; the big bang; multiple universes; and the births of stars, galaxies, heavy atoms, and planets. Prerequisite: Completion of quantitative literacy and Phyx 1000. (3Sp)

QI 3040. Space Weather—Dangers to the High-Tech World. Space weather can be as destructive to high technology as ordinary weather is to property and crops. Examines increasing vulnerability of society to events in space resulting from changes on the Sun and from human activity. Explores how we learn about space weather with satellites, radars, lidars, and numerical models. Prerequisite: Completion of quantitative literacy and physical sciences breadth. (3Sp)

3500. Topics in Physics (Topic). Introduces and explores issues in contemporary physics at intermediate undergraduate level. Focuses on phenomena and experimental methods. Prerequisite: Phyx 2710. (3F,Sp) ®

3550. Intermediate Classical Mechanics. Newton's laws of motion, accelerated reference frames, work and energy, systems of particles, rigid body rotation, central force problem, and harmonic oscillations. Prerequisites: Phyx 2710, Math 2210; Math 2250 (may be taken concurrently). (3F)

3600. Intermediate Electromagnetism. Electrostatics, electric potential, current, magnetostatics, induction, AC curcuits, Maxwell's equations, and electromagnetic waves. Prerequisites: Phyx 2710, Math 2210; Math 2250 (may be taken concurrently). (3Sp)

3650. Optics. Geometric optics, interference, diffraction, aberration, polarization, and topics in contemporary optics. Prerequisite: Phyx 2710. (3F)

3700. Thermal Physics. Rigorous treatment of laws of thermodynamics and statistical mechanics. Concepts of work, temperature, heat, energy, and entropy; and their application to reversible and irreversible processes. Criteria for equilibrium. Prerequisite: Phyx 2710. (3Sp)

3750. Foundations of Wave Phenomena. Survey of wave phenomena in physics, with emphasis on application of mathematical techniques to the wave equation, Schrodinger equation, and Maxwell equations. Prerequisites: Phyx 2710, Math 2210; Math 2250 (may be taken concurrently). (3Sp)

CI 3870. Intermediate Laboratory I. Modern experimental techniques, data and error analysis, experimental design, and communication skills. Exercises complement upper-level theory courses, and include some experiments of historical importance. Prerequisite: Phyx 2710. (2F)

CI 3880. Intermediate Laboratory II. Continuation of Phyx 3870. Prerequisite: Phyx 3870. (2Sp)

3900. Projects in Physics. Individual study pursued under direction of staff member. Prior to registration, arrangements must be made by student with appropriate staff member. (1-3F,Sp) ®

QI, DSC 4010. Chaos Under Control. Introduction to principles and applications of new sciences of fractals, chaos, and complexity. Importance of describing physical, geological, biological, and natural resource structures with fractals. Practical benefits of understanding and controlling erratic behavior in physical and living systems. Technological consequences of self-organized, adaptive behavior. Prerequisite: Completion of quantitative literacy and physical sciences breadth. (3Sp)

DSC 4020. Nature, Art, and Music. Explores how nature constrains production and appreciation of visual and auditory art. Relevance to art of: physics of sound and light, perspective and observer in relativity and quantum mechanics, symmetry, fractals, chaos, complex adaptive behavior, and self-organization. Prerequisites: Completion of computer and information literacy examination, quantitative literacy, and physical sciences breadth requirements. (3Sp)

CI 4250. Cooperative Work Experience. Planned work experience in industry or national laboratories. A detailed plan and the purpose of the experience must have prior approval. A written report is required. Prerequisite: Phyx 2710. (1-6F,Sp) ®

4550. Advanced Classical Mechanics. Lagrange's equations, Liouville's theorem, continua, Euler's equations, small vibrations, and special relativity. Prerequisites: Phyx 3550, 3750. (3F)

4600. Advanced Electromagnetism. Potential formulations of electrodynamics, energy and momentum, waves and boundary conditions, waves in dielectrics and conductors, guided waves, dipole radiation, and relativistic electrodynamics. Prerequisites: Phyx 3600, 4550. (3Sp)

4700. Quantum Mechanics I. Principles of quantum mechanics, operators in Hilbert space, matrix mechanics, angular momentum, spin, perturbation theory, and applications. Prerequisites: Phyx 3550, 3600, 3750. (3F)

4710. Quantum Mechanics II. Continuation of Phyx 4700. Prerequisite: Phyx 4700. (3Sp)

CI 4900. Research in Physics. Research experience pursued with faculty mentor. Prior to registration, student must make arrangements with the Physics Department's undergraduate research adviser. Prerequisite: Phyx 2710. (2F,Sp) ®

5050. Biophysics of Radiological Health. Brings together sciences relating to nuclear biophysics. Prepares students to be aware of radiological hazards, to safely use radioactive materials, and to comply with relevant laws. Prerequisites: Biol 1210, 1220, Chem 1210, 1220, a physics course, and senior standing. (3F,Sp)

5340. Methods of Theoretical Physics I. Physics applications of vector calculus and differential geometry, group theory, infinite series, complex analysis, differential equations, Sturm-Liouville theory, orthogonal functions, integral equations, and the calculus of variations. (3F)

5350. Methods of Theoretical Physics II. Continuation of Phyx 5340. Prerequisite: Phyx 5340. (3Sp)

5500. Intermediate Topics in Physics (Topic). Explores issues in contemporary physics at the advanced undergraduate and beginning graduate level. (3F,Sp) ®

CI 5810. Physics Colloquium I. A series of invited lectures on specialized topics in physics and related subjects. (1F)

CI 5820. Physics Colloquium II. A series of invited lectures on specialized topics in physics and related subjects. (1Sp)

CI 5870. Advanced Laboratory. Experimental experience with such modern techniques as scanning tunneling microscopy, LEED, Auger spectroscopy, and Fourier transform infrared spectroscopy. Prerequisite: Phyx 2710. (2F)

6010. Classical Mechanics I. Lagrange's equations, Hamilton's principle, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory, central forces, noninertial reference frames, rigid body motion, small oscillations, relativistic mechanics, canonical perturbation theory, continuum mechanics. Prerequisite: Phyx 4550 or equivalent. (3F)

6020. Classical Mechanics II. Continuation of Phyx 6010. Prerequisite: Phyx 6010. (3Sp)

6110. Electrodynamics I. Fundamental laws of electrostatics and magnetostatics; dielectric media, Maxwell's equations, time varying fields, and electromagnetic waves. Waveguides and radiation by moving charges. Prerequisite: Phyx 4600 or equivalent. (3F)

6120. Electrodynamics II. Continuation of Phyx 6110. Prerequisite: Phyx 6110. (3Sp)

6210. Quantum Mechanics I. Advanced quantum mechanics stressing the formalism of states and operators in the study of quantum dynamics, angular momentum, symmetry and group theory, perturbation theory and scattering. Prerequisite: Phyx 4710 or equivalent. (3F)

6220. Quantum Mechanics II. Continuation of Phyx 6210. Prerequisite: Phyx 6210. (3Sp)

6240. Space Environment and Engineering. Study of space environment and models used for engineering analysis. Topics include considerations for engineering in the space environment such as plasma interactions, debris, chemical reactions, radiation effects, and thermal issues. (3Sp)

6310. Solar-terrestrial Physics I. Study of solar-terrestrial physics, including planetary magnetic fields, the interaction of the sun with planetary properties (magnetic fields and atmospheres), and an overview of ionospheric measurement techniques. Study of the upper atmosphere and the physics occurring in each of the layers and zones, including the equatorial and polar ionosphere. Prerequisite: Phyx 4600 or equivalent. (3F)

6320. Solar-terrestrial Physics II. Continuation of Phyx 6310. Prerequisite: Phyx 6310. (3Sp)

6330. Plasma Physics I. Characteristics of the plasma state and plasma generation; velocity distribution functions, collisions and Boltzmann's equation; wave modes in a plasma; transport theory; plasma devices. Prerequisite: Phyx 4600 or equivalent. (3F)

6340. Plasma Physics II. Continuation of Phyx 6330. Prerequisite: Phyx 6330. (3Sp)

6360. Atomic and Molecular Spectroscopy. Electromagnetic radiation arising from atomic and molecular sources treated in terms of quantum mechanical models. Techniques for detection and analysis of such radiation. (3F)

6410. Statistical Mechanics I. Review of thermodynamics. Discussion of foundation of statistical mechanics and applications to ideal classical and quantum gases, blackbody radiation, ideal crystals, interacting classical gases and liquids, phase transitions, and critical phenomena. (3F)

6420. Statistical Mechanics II. Continuation of Phyx 6410. Prerequisite: Phyx 6410. (3Sp)

6530. Solid State Physics I. Development of the modern theory of the solid state. Emphasis placed on understanding the bulk properties of the solids, including crystal structure, cohesive properties, electronic structure, and lattice dynamics. Explores response to added stimuli, such as electric, magnetic, and optical fields. Prerequisites: Phyx 4600 and 4710; Phyx 6410 (can be taken concurrently). (3F)

6540. Solid State Physics II. Continuation of Phyx 6530. Prerequisite: Phyx 6530. (3Sp)

6550. Physics of Materials I. Application of microscopic (quantum) and macroscopic (classical) physics to study materials properties (e.g., bonding, structure, atomic dynamics, electrical, magnetic, thermal, optical), characterization methods, and a survey of materials. Prerequisites: Phyx 3700, 4710. (3F)

6560. Physics of Materials II. Continuation of Phyx 6550. Prerequisite: Phyx 6550. (3Sp)

6710. Nuclear and Particle Physics I. Size, shape, mass formulae, low-energy nucleon scattering, the deuteron, fission, reactions, models, electromagnetic interactions, and beta decay. Prerequisite: Phyx 6220. (3F)

6720. Nuclear and Particle Physics II. Continuation of Phyx 6710. Prerequisite: Phyx 6710. (3Sp)

6910. Relativity I. Foundations of spacetime physics. Survey of the basics of special and general relativity, including kinematics, mechanics, and electrodynamics in flat spacetime, the description of curved spacetime, and the Einstein equations. Exact solutions, applications, tests, and the mathematical techniques of general relativity. Prerequisites: Phyx 6020, 6120. (3F)

6920. Relativity II. Continuation of Phyx 6910. Prerequisite: Phyx 6910. (3Sp)

6930. Quantum Field Theory I. Detailed study of the relativistic quantum description of scalar, spinor, and vector fields in spacetime. Topics include gauge theories, canonical and path integral quantization, and interactions. (3F)

6940. Quantum Field Theory II. Continuation of Phyx 6930. Prerequisite: Phyx 6930. (3Sp)

6970. Thesis Research. Advanced research under guidance of one or more faculty members. (1-10F,Sp)

6990. Continuing Graduate Advisement. (1-3F,Sp) ®

7210. Spacecraft Instrumentation. Theory, engineering, and data reduction techniques of spacecraft instrumentation for space science and spacecraft systems. Taught on demand. (3)

7500. Advanced Topics in Physics (Topic). Explores issues in contemporary physics at the advanced graduate level. (3F,Sp) ®

7510. Seminar. (1-3F,Sp) ®

7970. Dissertation Research. (1-15F,Sp) ®

7990. Continuing Graduate Advisement. (1-3F,Sp) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Plants, Soils, and Biometeorology

College of Agriculture

Head: Professor *V. Philip Rasmussen*, sustainable agriculture
Office in Agricultural Science 322C, (435) 797-2233

Associate Head: Professor *William F. Campbell*, crop stress physiology
Graduate Program Coordinator: Professor *John G. Carman*, plant reproduction and development

FAX (435) 797-3376
E-mail soilcomp@cc.usu.edu
WWW http://psb.usu.edu

Professors *Rulon S. Albrechtsen*, plant breeding; *J. LaMar Anderson*, pomology; *Bruce G. Bugbee*, crop physiology; *Steven A. Dewey*, weed science; *Lynn M. Dudley*, soil physical chemistry; *John O. Evans*, weed science; *Anthony H. Hatch*, horticulture; *Donald T. Jensen*, climatology; *H. Paul Rasmussen*, horticulture; *Larry A. Rupp*, ornamental horticulture; *Schuyler D. Seeley*, pomology; *James H. Thomas*, international agronomy; *H. Grant Vest*, vegetable breeding; *Ralph E. Whitesides*, agronomy; **Research Professors** *Gail E. Bingham*, micrometeorology; *Stanford A. Young*, seed production; **Adjunct Professors** *Michael C. Amacher*, soil chemistry; *Kay H. Asay*, grass breeding; *Ray W. Brown*, plant physiology; *David L. Carter*, soil chemistry; *N. Jerry Chatterton*, forage/range physiology/biochemistry; *Wilford Gardner*, soil physics; *Henry F. Mayland*, soil science; *Charles W. Robbins*, soil science; *Dale R. Westermann*, soil science; *Raymond Wheeler*, plant physiology; *James L. Wright*, soil science; **Associate Professors** *Janis L. Boettinger*, soil genesis, classification and mineralogy; *Daniel T. Drost*, vegetable production; *Lawrence E. Hipps*, biometeorology; *David J. Hole*, cereal breeding; *Roger Kjelgren*, ornamental horticulture; *Jennifer W. MacAdam*, forage production and physiology; *Dani Or*, soil physics; **Research Associate Professors** *Esmaiel Malek*, biometeorology; **Adjunct Associate Professors** *Kevin B. Jensen*, forage breeding; *John M. Stark*, microbial ecology and biogeochemistry; *Helga Van Miegroet*, forest soils; **Assistant Professors** *Robert R. Gillies*, biometeorology; *Paul R. Grossl*, biogeochemist; *Paul G. Johnson*, turfgrass science; *Richard Koenig*, soil fertility; *Jeanette M. Norton*, soil microbiology; **Research Assistant Professor** *Raymond L. Cartee*, soils and irrigation; **Senior Lecturer** *D. Craig Aston*, ornamental horticulture; **Research Associates** *Susan Buffler*, irrigated pasture production; *Shyrl Clawson*, plant breeding; *Robert L. Newhall*, soil conservation and sustainable agriculture; **Director, Utah Botanical Gardens** *William A. Varga*, ornamental horticulture; **Assistant Director, Utah Botanical Gardens** *Debbie Amundsen*, horticulture; **Director, Soil Testing Lab** *Janice Kotuby-Amacher*, soil chemistry; **Professors Emeriti** *Keith R. Allred*, forage physiology; *Gaylen Ashcroft*, biometeorology; *Paul Christensen*, soil science; *Wade G. Dewey*, plant breeding; *Alvin R. Hamson*, horticulture; *R. John Hanks*, soil physics; *David W. James*, soil fertility; *Louis A. Jensen*, weed science; *Jerome J. Jurinak*, soil chemistry; *R. Paul Larsen*, horticulture; *DeVere McAllister*, plant breeding; *Frank B. Salisbury*, plant physiology; *John J. Skujins*, soil microbiology; *R. L. Smith*, soil science; *Alvin R. Southard*, soil classification; *David R. Walker*, pomology

Degrees Offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Crop Science, Horticulture, Environmental Soil/Water Science; Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Biometeorology, Plant Science, Soil Science, Physical Ecology, and Plant Ecology

Undergraduate emphases: *Crop Science BS, BA*–Agronomy, Agronomic Research, Biotechnology/Research; *Horticulture BS, BA*–Ornamental, Landscape Maintenance and Construction, Business, Science; *Environmental Soil/Water Science BS, BA*–Soil, Water, Plant; **Graduate specializations:** *Biometeorology MA, MS, PhD*–Agricultural Meteorology, Climatology, Micro-meteorology, Remote Sensing, Turbulence in Plant Canopies; *Plant Science MA, MS, PhD*–Crop Physiology, Crop Production and Management, Plant Breeding and Cytology, Plant Biotechnology and Tissue Culture, Plant Nutrition, Space Biology, Weed Science; *Soil Science MA, MS,*

PhD–Molecular Biology, Soil and Water Chemistry, Soil Biochemistry and Ecology, Soil Conservation Systems, Soil Fertility and Plant Nutrition, Soil Physics, Soil-Plant-Water Relations, Soil Taxonomy and Genesis, Soils and Irrigation

Certificate, Diploma, and Associate Degree Program: Ornamental Horticulture

Undergraduate Programs

Objectives

The departmental curricula emphasize understanding of basic plant sciences (including anatomy, physiology, and genetics) and environmental sciences (including air, water, and soil), and their impact on the management of crops, greenhouses, irrigation regimes, and landscapes. The department conducts research and disseminates information to maintain soil and water quality and to improve crop productivity, sustainability, and/or profitability.

The department strives to have quality teaching programs and curricula that will prepare students to serve clientele needs, and endeavors to ensure that students are well-trained in their areas of interest. The department also provides long-term programs for those wishing to continue their schooling. Integral to this mission are efforts to further the fundamental understanding of the soil-plant-atmospheric system.

"Cutting edge" basic and applied research is conducted in biometeorology (micro- and meso-scale), crop biotechnology, crop ecology, crop physiology, crop science, horticulture (general and ornamental), plant breeding, soil microbiology, pedology, soil chemistry, soil physics, soil fertility, environmental soil and water science, and arid landscaping.

Scientific support is provided for agriculture, industries, agencies, and others relying on the plant, soil, environmental, and climatological/biometeorological information in the state of Utah, the region, the nation, and the world.

A major objective of the department is to establish effective and efficient programs, methods, and procedures to extend research information to all clientele, both rural and urban, within the state of Utah.

Departmental Facilities

To support these objectives, departmental facilities include well-equipped laboratories and greenhouse facilities on campus. The University has significant acreage for field research at strategic locations throughout the state. In addition, the University is developing a botanical garden, which will offer opportunities to a broad spectra of clientele. The department maintains state-of-the-art analytical equipment for the measurement of critical soil, plant, and climatic variables.

Precautions appropriate to handling potentially harmful laboratory chemicals are taught and practiced. Departmental laboratories are in compliance with Occupational Safety and Health Administration (OSHA) Laboratory Standards. Radiological and chemical aspects of departmental research are monitored by the University Safety Office.

Requirements

Departmental Admission Requirements. Persons meeting the admission requirements for the University (see pages 43-46) are admitted to the Department of Plants, Soils, and Biometeorology by listing the department major code on the University admission application form. A change of major form is used when students in good standing wish to transfer from another department to the Department of Plants, Soils, and Biometeorology.

ARCPACS Certification. Students who meet specific requirements are eligible, after five years of work experience, for professional certification as an Agronomist, Crop Scientist, Crop Specialist, Horticulturist, Soil Scientist, Soil Specialist, Soil Classifier, or Weed Scientist through the American Registry of Certified Professionals in Agronomy, Crops, and Soils (ARCPACS). Course requirements for certification are listed below. Students interested in becoming certified should inform their adviser of their intent.

Applied Ornamental Horticulture Certificates and AAS Degree. This program provides practical training in greenhouse and nursery management, turf production, floral design, and maintenance of home and commercial grounds. Coursework encompasses pest control, plant identification, construction of landscapes, small business management, and the operation and maintenance of equipment, including small engines. As an integral part of their training, students are required to complete an internship in the industry. Students may work toward a **one-year certificate,** a **two-year diploma,** or an **Associate of Applied Science Degree.**

Bachelor of Science Degree. The department offers the Bachelor of Science Degree in three areas: (1) **Crop Science,** which deals with agronomic (commonly called field) crops, such as forages, grains, corn, pasture, etc.; (2) **Horticulture**, which deals with tree fruits, berries, vine fruits, vegetables, and ornamental plants (**ornamental** includes all aspects of floriculture and landscape plant production and use); and (3) **Environmental Soil/Water Science**, which deals with soil and water in relation to plant growth and environmental quality. In all three majors, there are science-oriented options intended to prepare students for research or professional studies, in addition to degree options that emphasize a practical, applied approach. All courses used to fill major requirements must be taken on an *A-B-C-D-F* basis. A minimum 2.5 GPA is required for courses used for the major. Transfer students are required to take at least 18 credits of major subject courses in residence at USU. **A minor** may be earned in Agronomy, Crop Biotechnology, Horticulture, Ornamental Horticulture, and Soil Science. A minimum of 16 approved credits are required (see lists below). All courses must be taken on an *A-B-C-D-F* basis and passed with a grade of *C* or better.

The course requirements for the **Crop Science Major** are designed to prepare students for a career related to the production of food and feed crops. These courses allow students to function well in a rapidly changing technological environment and to acquire new skills and understanding as their career evolves. Each

of the options within this major has been designed to allow students the flexibility to add courses or a minor to meet their own goals. The **Agronomy Option** is designed for students interested in learning more about the applied aspects of crop production. Some courses emphasize production techniques and systems, while others provide the student with an understanding of the principles underlying crop production. The **Biotechnology/Research Option** is designed for students who wish to participate in the development of plant-oriented technologies at any level of employment, and for those who intend to pursue a career in private or public research or to teach at the university level. The **Agronomic Research Option** is designed for students planning careers in production-oriented agronomic research.

The **Horticulture Major** prepares students for production of fruits, vegetables, turf, or ornamentals and for landscape construction and maintenance. Course topics include biology, chemistry, and control of insects, diseases, and weeds. The **Ornamental Option** adds courses in production management techniques, such as pruning, spraying, and landscaping (materials, design, and maintenance); and greenhouse management. In the **Landscape Maintenance and Construction Option**, students learn design, construction, and maintenance through a joint program with the Landscape Architecture and Environmental Planning Department. The **Science Option** prepares students for graduate study and for employment in technical occupations. The **Business Option** joins courses necessary for a minor in Business with those necessary for obtaining expertise in horticulture.

The **Environmental Soil/Water Science Major** is intended to provide each student with a fundamental understanding of the basic sciences and mathematics, as well as a strong background in both soil and water sciences. Preparatory requirements include chemistry, physics, mathematics, biology, geology, and statistics. The core courses for Environmental Soil/Water Science emphasize the interactive soil/water processes in the soil's plant-rooting zone—from the microscopic to the landscape perspective. From this base, each student can design his or her own program of specialization in one of the many aspects of soil science, water science, or the integration of both soil and water sciences. Students may choose complementary classes in the **Soil Option**, **Water Option**, **Plant Option**, or a combined option in preparation for a variety of career opportunities. The Environmental Soil/Water Science Major is complementary to existing undergraduate programs at Utah State University in Geology, Environmental Studies, Watershed Science, and Environmental Engineering.

Course Requirements

Crop Science Major

Agronomy Option. Students must complete the following courses: Biol 1210, 1220, 1230, 4400, Chem 1110, 1120, 1130, Econ 1500, Math 1050, Phyx 1200, PlSc 2000, PSB 1050, 4890 (two semesters), Soil 3000. Additional plant science requirements include at least 24 credits selected from the following, including at least 6 credits selected from courses identified with an asterisk (*): Biol 4410, 4500*, 5410*, FW 5100*, PlSc 2650, 3500, 3700, 3800, 4280, 4300, 4320, 4600, 5200, 5210, 5550*, 5700. Additional soil science requirements include least 15 credits selected from the following: Soil 4000, 4700, 5050, 5130, 5310, 5320, 5550, 5560, 5650.

Students wishing to accumulate the minimum core requirements for **ARCPACS certification** should *replace* the additional plant science requirements (24 credits, listed above) and soil science requirements (15 credits, listed above) as follows. For **Certified Agronomist** or **Certified Weed Scientist** status, take 9 credits from the following: PlSc 3800, 4280, 4300, 4320, 4600, 5200, 5210, 5700; for **Certified Crop Scientist** or **Crop Specialist** status, take 12 credits from the following: PlSc 3800, 4280, 4300, 4320, 4600, 5200, 5210, 5700; for **Certified Agronomist**, **Certified Crop Scientist**, or **Crop Specialist** status, take two of the following four courses: Biol 4500, 5410, FW 5100, PlSc 5550; for **Certified Agronomist**, **Certified Crop Scientist**, or **Crop Specialist** status, take ASTE 3050, Spch 3050, CS 1010, Econ 2010, and Stat 1040; for **Certified Weed Scientist** status, take 22 credits from the following, ensuring courses marked with an asterisk are taken: Biol 2400*, 3050, 4410*, 4500, 5410, FW 5100, PlSc 2200*, 5550*; for **Certified Agronomist**, **Certified Crop Scientist**, **Crop Specialist**, or **Certified Weed Scientist** status (all ARCPAC categories), take Chem 1210, 1220, and Soil 5550 in place of Chem 1110 and 1130; for **Certified Agronomist** and **Certified Weed Scientist** status, take Soil 5550.

Agronomic Research Option. Students must complete the following courses: Biol 1210, 1220, 1230, 2200, 4400, Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3700, 3710, Econ 1500, Math 1050, 1060, Phyx 1200, PlSc 2000, 5200, 5210, PSB 1050, 4890 (two semesters), Soil 3000, 5550, 5560. In addition, select 11 credits from the following: PlSc 2650, 3700, 4280, 4300, 4320, 4600, 5550, 5700. Other recommended courses include: Biol 4410, 4500, 5410, Math 1210, Phyx 2110.

Biotechnology/Research Option. Students must complete the following courses: Biol 1210, 1220, 1230, 2200, 4200, 4400, 4410, Chem 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3700, 3710, Econ 1500, Math 1050, 1060, Phyx 1200, PlSc 2000, 4300, 5200, 5210, 5440, 5450, PSB 1050, 4890 (two semesters), Soil 3000. Select at least two credits from the following courses: PlSc 3700, 4600, 5550, 5700. The following courses are also recommended: ADVS 5160, Biol 5410, Chem 5240, Math 1210, Phyx 2110.

Horticulture Major

Core Courses. Biol 1210, 1220, 1230, 2220, Chem 1110 or 1210, BIS 1400, Math 1050, PlSc 2000, 2250 (or PSB 4250), 2650, 3200, PSB 1050, 4890 (two semesters), Soil 3000.

Ornamental Option. In addition to the Core courses, select 36 credits from the following. Those marked with an asterisk (*) are required. ASTE 3080, PlSc 2600*, 2610*, 2620*, 3050, 3170, 3300, 3400, 3410, 3700, 3800, 4100, 4400*, 4500*, Soil 5550*. Select two courses from the following: Biol 4500, 5410, FW 5100, PlSc 5550*. Select two of the following courses (not including Chem 1130): Biol 4400, 4410, Chem 1120, 1130, PlSc 3500, 5200, 5210.

Landscape Maintenance and Construction Option. In addition to the Core courses, students must complete all of the following: LAEP 1200, 1350, 2600, 3500, 3620, PlSc 2200, 2600, 2620, 3400, 3410, 3500, 3800, 4100, 4400, 4500. Suggested electives include: ASTE 3200, PlSc 3700, Soil 4700, 5550.

Business Option. In addition to the Core courses, select 22 credits from the following. Those marked with an asterisk (*) are required. Biol 4500, 5410, PlSc 2200*, 2600, 2620, 3400, 3500*,

3700, 3800, 4400*, 4500*, 5200, 5210, 5550*, Soil 5550. The following courses are required for a **Business Minor:** Acct 2010, BA 3460, 3500, MHR 2990, 3110, BIS 3100.

Science Option. In addition to the Core courses, select 36 credits from the following. Those marked with an asterisk (*) are required. Biol 2220, 4400, 4410, 5400, Chem 1120, 1220, 1230, 1240, 2310, 2320, 3700, 3710, Math 1060, 1100*, Phyx 1200, PlSc 3170, 3700, 4400*, 4500*, any ornamental horticulture class*, PlSc 5200, 5210, 5760, Soil 5550*, Stat 3000. Select one of the following: Biol 4500, 5410, FW 5100, PlSc 5550.

Environmental Soil/Water Science Major

Core Courses. Biol 1210, 1220, 1230; Chem 1110, 1120, 1130, *or* Chem 1210, 1220, 1230, 1240, 2310; Math 1050, 1060, 1210, *or* Math 1210, 1220; Phyx 2110, 2120, *or* Phyx 2210, 2220; Geol 1150; RLR 2200; Stat 2000.

Professional Core Courses. Soil 3000, 5050, 5130; Soil 5310 or 5550 (Soil 5550 is required for the plant option); Soil 5560, 5650, 5750, PSB 4890 (two semesters). **Options:** Students must select 12 credits from one or a combination of the following options:

Soil Option. Bmet 5250; Chem 3600; Geog 3900, 5930; Geol 3500, 3550, 3600, 3700, 5600, 5630; Soil 3100, 4000, 5310, 5320, 5350, 5550.

Water Option. ASTE 5260; Bmet 3820, 4300, 5250, 5500, 5700; CEE 3430, 3500; Chem 3600; FW 4500, 4510; Geog 5330; Geol 5510; Soil 4000, 4700; WS 3700, 5500, 5660; BIE 5010, 5110, 5150; PlSc 5200, 5210.

Plant Option. Biol 2400, 4400; Soil 4000, 4700, 5310, 5320; Bmet 5500; PlSc 2600, 2610, or 2620; PlSc 3300, 3400, 3410, 3800, 4100, 4280, 4300, 4320, 4400, 4500, 5200, 5210, 5430, 5550, 5760; RLR 4450.

Applied Ornamental Horticulture Certificates and AAS Degree

One-Year Certificate (27 credits required). PlSc 2600 and 2610 are required; 19-21 additional PlSc credits must be completed from applied core courses emphasizing floriculture or landscape horticulture; and 2-4 credits from approved electives.

Two-Year Diploma (53 credits required). Students must complete all applied core courses (39-42 credits) and 9-14 credits of approved electives.

Associate of Applied Science degree (64 credits required). Students must complete all applied core courses; 8-11 credits of approved electives; and 14 credits of University Studies (General Education), including Engl 1010 and 2010; 5-7 credits Breadth Social Sciences (BSS)/Breadth Humanities (BHU) courses; 3-5 credits Breadth Life Sciences (BLS)/Breadth Physical Sciences (BPS) courses.

Applied Core Courses. BIS 1400, PlSc 2000, 2200, 2250, 2600, 2610, 2620, 3050, 3200, 3300, 3400, 3410, 3700, 3800, PSB 1050.

Approved Electives. Choose any courses that are part of a BS degree in horticulture (8-11 credits required).

Minors

Crop Biotechnology Minor (16 credits required). The following courses are required. PlSc 2000, 5200, 5750. Select the balance of credits from the following courses. At least one of the production courses, marked with an asterisk, (*) is required. PlSc 3170, 3700*, 4280*, 4300*, 4320*, 4400*, 4500*, 5550, 5700, PSB 5160, 5240, 5260.

Agronomy Minor (16 credits required). A minimum of 6 credits of Soil Science courses must be taken, including Soil 3000. A minimum of 6 credits of Plant Science courses must be taken, including at least two of the following three courses: PlSc 4280, 4300, 4320. Select the balance of credits from the following courses: Soil 4000, 4700, 5130, 5550, 5560, 5650, PlSc 2200, 3800, 4400, 4500, 5200, 5550, 5700.

Soil Science Minor (16 credits required). The following course is required: Soil 3000. Select 12 credits from the following courses: Soil 4000, 4700, 5050, 5130, 5310, 5350, 5550, 5560, 5650, 5750.

Ornamental Horticulture Minor (16 credits required). The following courses are required: Soil 2000, PlSc 2200, 3200. Select the balance of credits from the following courses: PlSc 2600, 2610, 2620, 3050, 3170, 3300, 3400, 3410, 3700, 3800, 4400, 4500.

Horticulture Minor (16 credits required). The following courses are required: Soil 2000, PlSc 3200. Select 6 credits from the following courses: PlSc 2200, 4400, 4500, one Ornamental Horticulture course. Select the remaining credits from the following: PlSc 2000, 2650, 3050, 3170, 3300, 3800.

Additional Information

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheets available from the Plants, Soils, and Biometeorology Department.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. Departmental admission committees and potential graduate student advisers (major professors) consider previous work experience, undergraduate and graduate records and curriculum, and formal recommendations in their decisions concerning acceptance of applicants. Students without an undergraduate or graduate degree in plants, soils, biometeorology, or a closely related field may be required to complete selected undergraduate courses prior to admission as fully matriculated graduate students in the Plants, Soils, and Biometeorology Department. Qualified applicants are occasionally denied admission because faculty

members in the applicant's area of interest do not have the time or funds to advise additional students. The serious applicant is encouraged to discuss his or her goals with appropriate members of the graduate faculty prior to preparing an application.

Graduate student candidates must have scores on the verbal and quantitative portions of the Graduate Record Examination (GRE) at or above the 40th percentile. TOEFL scores of 550 or higher are required for candidates from abroad. International students with a prior degree from an English-speaking university are exempted from the TOEFL exam.

Degree Programs and Specializations

The Master of Science and Doctor of Philosophy degrees are offered as follows: (1) **Plant Science** with specializations in crop production and management, weed science, plant nutrition, crop physiology, plant breeding and cytology, and space biology; (2) **Soil Science** with specializations in soil physics, soil and water chemistry, soils and irrigation, soil fertility and plant nutrition, soil biochemistry and ecology, molecular biology (interdepartmental program), soil biochemistry and ecology, soil conservation systems, soil-plant-water relations, and soil taxonomy and genesis; (3) **Biometeorology** with specializations in agricultural meteorology, climatology, micrometeorology, turbulence in plant canopies, and remote sensing; and (4) **Physical Ecology**.

Course Requirements

Course requirements leading to MS or PhD degrees are developed jointly by the student and the student's advisory committee. Course selections reflect areas of specialization. There are, however, specific departmental requirements regarding physical sciences, biological sciences, and mathematics courses, which differ depending on the area of specialization.

Research

Research projects vary over time, depending on funding and other factors. Students are encouraged to visit the home page web sites of the graduate faculty to determine research interests and lists of recent publications. Some of the research interests in the department include (1) the control of diseases, nematodes, weeds, phytoremediation, and other hazards to fruit, vegetable, horticultural, and field crops; (2) physiological and genetic improvement of fruit, vegetable, horticultural, and field crops (breeding and biotechnology); (3) the evolution, genetic regulation, and utilization of apomixis and other developmental phenomena of higher plants; (4) management of agronomic production systems; (5) soil formation and landscape evolution; (6) soil, plant, water, and nutrient relationships; (7) management of saline and sodic soils; (8) alternative land uses; (9) improved management of animal wastes and biosolids; (10) management of soil microbial processes; (11) drainage and irrigation systems; (12) adaptations to weather and weather modification; (13) analyses and modification of large-scale surface evaporation from atmospheric boundary layer measurements; (14) spatial and temporal properties of sun flecks in plant canopies; (15) spatial variation in surface fluxes of heat and water vapor in semiarid regions; and (16) landscape water management.

Financial Assistance and Assistantships

The financial awards provided by the School of Graduate Studies are listed on pages 59-60 of this catalog. The Department of Plants, Soils, and Biometeorology does not have a formal application form for financial assistance. Most monies used to assist students in the department come from research grants controlled by individual faculty members. Negotiations for financial assistance (research assistantships or part-time employment) are made between faculty members and students. The department provides a few part-time teaching assistantships (a semester at a time). Graduate teaching assistants are responsible to their major professor and to the instructor whom they assist.

Career Opportunities

A broad range of career opportunities exists for students completing the MS or PhD degree from the Department of Plants, Soils, and Biometeorology. Graduate students specializing in the plant sciences may expect to find employment as consulting scientists, or in the private sector as plant breeders, weed scientists, etc. Graduate students specializing in the soil sciences may expect to find employment as soil scientists with government agencies or in the private sector, where they may pursue careers in environmental consulting, fertilizer retail, irrigation system design, waste management, mineland reclamation, or related environmental or agricultural pursuits. Graduate students specializing in biometeorology may expect to find employment with government agencies, as consulting scientists, or with the private sector. Graduate students specializing in physical ecology may expect to find employment as research scientists, as consulting ecologists, or with environmental agencies. Graduate students completing the PhD may also find career opportunities in academia.

Additional Information and Updates

Additional information and updates concerning graduate faculty and graduate student opportunities can be obtained from the web at: http://psb.usu.edu.

Plant Science Courses (PlSc)

BLS 2000. Plants, Genes, and Agriculture. Introduction to the scientific process as it relates to modern agriculture. Principles of the disciplines involved in production of agronomic and horicultural crops, both for food and aesthetic purposes. Data and interpretation as separate components of the scientific process. Prerequisite: Math competency. (3Sp)

2200. Pest Management Principles and Practices. Overview of pest control considerations, procedures, and principles. Topics include integrated pest management, organic and chemical pest control, environmental considerations, safety, life cycles of pests, and commercial pesticide licensing. (3Sp)

2250. Occupational Experience in Agronomy and Horticulture. Provides credit for on-the-job training in agronomic or horticultural industries. (1-4F,Sp,Su)

2600. Annual and Perennial Plant Materials. Identification, culture, and utilization of herbaceous ornamental plants in the landscape, including annual and perennial flowering plants, herbaceous ground covers, ornamental grasses, bulbous plants, and herbs. (1.5F)

2610. Indoor Plants and Interiorscaping. Identification, culture, use, and maintenance of indoor foliage and flowering plants used in the interior plantscaping industry. (1.5F)

2620. Woody Plant Materials: Trees and Shrubs for the Landscape. Identification, culture, and utilization of woody ornamental plants in the landscape, including shade trees, flowering trees and shrubs, hedge plants, and vines. Review of native plants commonly used in the landscape. (3F)

2650. Identification and Selection of Plants in Production Agriculture. Identification of plants important in horticulture/agronomy and the morphological features making them useful for various agricultural purposes. (1F)

2900. Special Problems in Plant Science. Student-selected practical problems in horticulture and/or agronomy. (1-4F,Sp,Su)

3010. Basic Flower Arranging. Principles of basic flower design using fresh, dried, and artificial flowers. Proper care of cut flowers and foliages. Basic plant physiology behind such principles. Lab fee required. (2F)

3020. Floral Crops Judging and Contemporary Design. Judging of potted ornamental plants and cut flowers for quality. Contemporary floral design and floral art. Prerequisite: PlSc 3010 or professional design experience. Lab fee required. (2Sp)

3050. Greenhouse Management and Crop Production. Design and management of commercial greenhouse facilities. Production requirements of primary greenhouse crops. (4Sp)

3170. Plant Micropropagation. Practical exposure to and scientific basis of laboratory techniques used in commercial micropropagation of horticultural, agricultural, and forestry plants. (2Sp)

DSC 3200. Horticultural Science. Methods, technology, and scientific basis of landscape, fruit, and vegetable gardening in the arid west. Interaction of gardening with the urban environment. (3F)

3300. Residential Landscapes. Functional and aesthetic relationships of plants and structures in the landscape in connection with installation considerations. Use of imaging and CAD software in initial computer design layout. Prerequisite: PlSc 2620. Recommended: PlSc 2600. (3Sp)

3400. Managing for Sustainable Landscapes. Interaction of expectations, maintenance needs, cost/benefit analysis, physiology, and ecology in managing landscapes on a sustainable basis. Prerequisites: PlSc 2600, 2620. (3F)

3410. Practicum in Managing for Sustainable Landscaping. Practical experience in evaluating maintenance tasks required in managing a landscape, cost estimation of such tasks, and how to make changes to a landscape to reduce costs. (1F)

3500. The Structure and Function of Economic Crop Plants. Environmental effects on plant structure and function. Control of plant development for enhanced production of marketable goods. Introduction to principles using examples from horticulture and agronomy. Applications in these fields emphasized. Prerequisite: Integrated Science or comparable breadth course. Prerequisite: Biol 1220. (3Sp)

3700. Plant Propagation. Propagation of plants by sexual and asexual means. Covers fundamental physiology of propagation, as well as cultural practices and techniques used in plant science. Recommended: Biol 1210, 1220. (3F)

3800. Turfgrass Management. Fundamentals of turfgrass science: species adaptation, identification, and cultural requirements; turfgrass growth and development; establishment; primary cultural practices (fertilization, irrigation, mowing); secondary cultural practices; pest management; integrated management planning for turfgrass systems. Prerequisites: Biol 1210, PlSc 2650, 3500, or equivalents. (3F)

4100. Landscape Water Conservation. Explains why water conservation is important, and how water can be conserved through precision irrigation and conversion to low-water-use landscapes. (2F,Sp,Su)

4280. Field Crops. Economic importance, use, distribution, origin, history, classification, identification, botanical nature, marketing, processing, storage, certification, grading, diseases, insects, commercial production, and improvement of cereal, root, and oilseed crops. Two lectures, one lab per week. (3F)

4300. World Food Crops and Cropping Systems: The Plants That Feed Us. Climatic, geographic, and management requirements of the world's plants that provide food for humans, including botanical relationships. Systems used to produce these crops and processes for turning them into food. Prerequisite: Integrated Science or comparable breadth course. (3Sp)

4320. Forage Production and Pasture Ecology. Cultivation and management of legumes and grasses used throughout the world for grazing, stored feed, soil improvement, and conservation. Forage plant growth and development, nutrient and water utilization, and responses to environmental stress. Prerequisite: Integrated Science or comparable breadth course. (3Sp)

4400. Modern Vegetable Production. Principles and practices underlying scientific vegetable culture. Discussion of production of important vegetables, focusing on the physiological processes influencing their culture. Explores crop performance in research and commercial applications. Prerequisite: Biol 1210. (3F)

4500. Fruit Production. Cultivars, physiology, anatomy, propagation, sites, soils, climate, culture, irrigation, fertilizers, insects, diseases, integrated management, plant and fruit growth and development, harvesting, storage, pruning, orchard architecture, environmental protection, and economics for both tree and small fruits. Recommended prerequisite: Biol 1220. (4Sp)

***DSC, QI 4600. Cereal Science.** Introduction to principles involved in cereal chemistry and processing. Covers starch chemistry, dry milling, wet milling, decortication, malting, and extrusion. Processing of all major cereals also covered. Prerequisite: Math 1030 or Stat 1040 or completion of quantitative literacy requirements. (3Sp)

4800. Soil Management for Turfgrass and Urban Landscapes. Fertilization, irrigation, and cultivation practices for managed landscapes. Construction issues, including compaction, soil modification, and specialized construction practices for golf courses and sports turf. Prerequisites: Soil 3000, PlSc 3800. (2Sp)

5200 (d6200).[1] Crop Physiology. The relationship between physiological processes and growth of whole plants. Energy balance and water use efficiency. Light interception and canopy geometry. Canopy photosynthesis and respiration. Carbon partitioning and source/sink relationships. Prerequisites: Biol 4400, Math 1050, or consent of instructor. (2Sp)

5210 (d6210). Crop Physiology Laboratory. Measurement and analysis of physiological processes that result in whole plant growth. Includes an individual lab project. Designed to be taken concurrently with PlSc 5200 or 6200. (1Sp)

***5300. Principles of Cytogenetics.** Examination and analysis of variation in chromosome structure, behavior, and number. Includes discussions of developmental and evolutionary effects of this variation, and practical applications in plant and animal genetics. Prerequisite: Biol 2200. (3Sp)

****5430 (d6430). Plant Nutrition.** Mechanisms of nutrient acquisition, rhizosphere interactions, root morphology and distribution, short- and long-distance transport, nitrogen fixation, and biochemical function of essential and beneficial elements. (2F)

****5440 (d6440). Plant Molecular, Cellular, and Developmental Biology I.** Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. Prerequisites: Biol 2200, 4200; Chem 3700. (3Sp)

***5450 (d6450). Plant Molecular, Cellular, and Developmental Biology II.** Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from a research perspective. Prerequisites: Biol 2200, 4200, Chem 3700. (3Sp)

5550 (d6550). Weed Biology and Control. Management strategies for undesirable plant species in native and agroecosystems. Interference and allelopathy, undesirable plant invasion and spread, noxious weed eradication principles and practices, integrated plant management strategies, herbicide interactions with weeds and crops, and economics of management options. (4F)

****5700. Principles of Plant Breeding.** Principles of plant breeding. Breeding techniques for self-pollinated, cross-pollinated, and asexually reproducing crops. Real-life breeding problems solved, showing that resource identification and allocation are the critical points in developing a successful program. Prerequisite: PlSc 2000 or Biol 2200. (3Sp)

****5750. Crop Biotechnology.** Lectures and laboratory exercises focusing on concepts, equipment, and procedures required for culturing plant cells and tissues, producing and processing secondary compounds in vitro, and genetic engineering of angiosperms. Presentation of physiological and biochemical factors important to success. Prerequisite: Biol 4400. (3Sp)

5760. Crop Ecology. Features of agroecosystems compared with natural ecosystems; input of energy and materials to manipulate agroecosystems and produce maximum, sustained quality and yield of agricultural products. Prerequisites: Biol 4400, PlSc 5200/6200, or instructor's consent. (2Sp)

6200 (d5200). Crop Physiology. The relationship between physiological processes and growth of whole plants. Energy balance and water use efficiency. Light interception and canopy geometry. Canopy photosynthesis and respiration. Carbon partitioning and source/sink relationships. Prerequisites: Biol 4400, Math 1050, or consent of instructor. (2Sp)

6210 (d5210). Crop Physiology Laboratory. Measurement and analysis of physiological processes that result in whole plant growth. Includes an individual lab project. Designed to be taken concurrently with PlSc 5200 or 6200. (1Sp)

****6430 (d5430). Plant Nutrition.** Mechanisms of nutrient acquisition, rhizosphere interactions, root morphology and distribution, short- and long-distance transport, nitrogen fixation, and biochemical function of essential and beneficial elements. (2F)

****6440 (d5440). Plant Molecular, Cellular, and Developmental Biology I.** Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. Prerequisites: Biol 2200, 4200; Chem 3700. (3Sp)

***6450 (d5450). Plant Molecular, Cellular, and Developmental Biology II.** Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from research perspective. Prerequisites: Biol 2200, 4200, Chem 3700. (3Sp)

6550 (d5550). Weed Biology and Control. Management strategies for undesirable plant species in native and agroecosystems. Interference and allelopathy, undesirable plant invasion and spread, noxious weed eradication principles and practices, integrated plant management strategies, herbicide interactions with weeds and crops, and economics of management options. (4F)

***6570. Herbicide Physiology and Mode of Action.** Entrance, movement, and metabolism of major herbicides; and a critical study of the physiological processes affected by them. Prerequisites: Biol 4400, PlSc 5550/6550 or instructor's consent. (3Sp)

Soil Science Courses (Soil)

BPS 2000. Soils, Waters, and the Environment. Introduction to principles of physical and biological science. Discussion of current environmental topics, focusing on soil and the waters that contact the soil. Topics include water quality, global climate change, deforestation, soil conservation, and agricultural sustainability. (3Sp)

3000. Fundamentals of Soil Science. Fundamentals of soil science, emphasizing physical, chemical, mineralogical, and biological properties of soils, and how these properties relate to plant growth and environmental quality. Prerequisites: Chem 1110, Math 1050, or equivalents. (4F,Sp)

DSC 3100. Soils and Civilization. Lectures, readings, and discussions to explore effects of soil physical, chemical, and biological properties on civilization throughout history. Influence of soils on settlement patterns, land use/management, and civilization decline. Case studies focus on current soil and land use issues in western North America. (3Sp)

4000. Soil and Water Conservation. Applied soil and water conservation in agronomic setting. Management of soil-water-plant-atmosphere continuum. Soil conservation techniques as they apply to actual situations. (4F)

4700. Irrigated Soils. Soil salinity, soil-moisture-plant relationships, water supply and quality, irrigation water measurements, soil moisture movement, and irrigation methods. Prerequisite: Soil 3000 or equivalent, or instructor's consent. (2Sp)

5050 (d6050). Principles of Environmental Soil Chemistry. Introduction to common chemical processes occurring among solid, liquid, and gas phases in soil systems. Emphasis placed on chemistry of arid land soils. Prerequisites: Algebra, general chemistry, and fundamentals of soil science. (3Sp)

5130 (d6130). Soil Genesis, Morphology, and Classification. Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body on the landscape: its properties, distribution, behavior, and interpretations for diverse land uses. Prerequisite: Understanding of fundamental soil science; Soil 3000 recommended. (4F)

***5310. Soil Microbiology.** Ecology and diversity of microorganisms in soils. Emphasis on factors controlling microbial activity and the role of microorganisms in organic matter decomposition and nutrient cycling. Prerequisites: Biol 1210, 1220, 1230; Chem 2300 or 2310; Soil 3000. (3F)

***5320. Soil Microbiology Laboratory.** Techniques for measuring microbial activity and diversity in soils. Includes use of molecular and isotope methods. Prerequisite: Concurrent or prior enrollment in Biol/Soil 5310. (2F)

5350 (d6350). Wildland Soils. Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: General chemistry, Soil 3000, and one other upper-division Soils course, or permission of instructor. (3Sp)

5550 (d6550). Soils and Plant Nutrient Bioavailability. Description of forms, transformations, and movement of plant nutrients in soils. Discussion of factors affecting nutrient supply, both qualitatively and quantitatively, for nutrient elements essential for plant growth. Prerequisites: Soil 3000; Chem 1110 or 1210. (3Sp)

5560 (d6560). Analytical Techniques for the Soil Environment. Analysis of chemical and biological soil characteristics. Results interpreted for soil fertility, land use, and environmental remediation. Graduate credit requires a paper reviewing analysis of element or compound class. Prerequisite: Soil 5050/6050 or 5550/6550 (may be taken concurrently), or instructor's permission. (2Sp)

5650 (d6650). Applied Soil Physics. Characterization of the physical properties of soils and other porous media. Measurement, prediction, and control of processes taking place in and through soils (e.g., water flow and solute transport), including atmospheric and groundwater interactions. (3F)

5750. Environmental Quality: Soil and Water. Capstone course for Environmental Soil/Water Science (ESWS) major. Students analyze three case studies from current soil and water pollution problems, formulate remediation or mitigation plans, and present findings in oral and written reports. Open to ESWS seniors or with instructor's permission. (2Sp)

6050 (d5050). Principles of Environmental Soil Chemistry. Introduction to common chemical processes occurring among solid, liquid, and gas phases in soil systems. Emphasis placed on chemistry of arid land soils. Prerequisites: Algebra, general chemistry, and fundamentals of soil science. (3Sp)

6130 (d5130). Soil Genesis, Morphology, and Classification. Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body on the landscape: its properties, distribution, behavior, and interpretations for diverse land uses. Prerequisite: Understanding of fundamental soil science; Soil 3000 recommended. (4F)

****6140. Unsaturated Flow and Transport.** Measurement, prediction, and control of transport processes taking place in and through partially saturated porous formations (e.g., water flow and solute transport), emphasizing parameter estimation and multi-dimensional flow. (3F)

****6190. Salt-affected Soils.** Emphasis on chemistry of salt-affected soils. Topics include carbonate chemistry, cation exchange, and reclamation of sodium and salt-affected soils. Exploration of effects of sodium accumulation on soil hydraulic conductivity and the biochemistry of salt and potentially toxic elements. (2Sp)

****6200. Biogeochemistry of Terrestrial Ecosystems.** Inputs, outputs, and cycling patterns of major nutrients. Emphasis on mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: Biol 1220, Soil 3000, Chem 2300 or 2310, or permission of instructor. (3F)

6350 (d5350). Wildland Soils. Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: General chemistry, Soil 3000, and one other upper-division Soils course, or permission of instructor. (3Sp)

****6400. Spatial and Temporal Estimation Methods for Environmental Sciences.** Introduction to methods for obtaining spatial information and interpolation schemes. Incorporation of uncertainty into dynamic models (temporal predictions). Methods and models for combining spatial and temporal information, with applications to monitoring and forecasting natural processes. (2Sp)

6550 (d5550). Soils and Plant Nutrient Bioavailability. Description of forms, transformations, and movement of plant nutrients in soils. Discussion of factors affecting nutrient supply, both qualitatively and quantitatively, for nutrient elements essential for plant growth. Prerequisites: Soil 3000; Chem 1110 or 1210. (3Sp)

6560 (d5560). Analytical Techniques for the Soil Environment. Analysis of chemical and biological soil characteristics. Results interpreted for soil fertility, land use, and environmental remediation. Graduate credit requires a paper reviewing analysis of element or compound class. Prerequisite: Soil 6050/5050 or 6550/5550 (may be taken concurrently), or instructor's permission. (2Sp)

6650 (d5650). Applied Soil Physics. Characterization of the physical properties of soils and other porous media. Measurement, prediction, and control of processes taking place in and through soils (e.g., water flow and solute transport), including atmospheric and groundwater interactions. (3F)

****6720. Chemistry of Arid Land Soils.** Chemical equilibria and kinetics of arid land soils. Special emphasis on solubility relationships of soil minerals and on carbonate chemistry. (3Sp)

***7200. Soil Interfacial Processes and Reactive Transport.** Course divided into two blocks. Subject matter for first block is soil electrochemistry and surface chemistry. Second block applies material from first block to system in which transport limits reaction time. (3Sp)

****7210. Pedology.** Strategies for designing and critiquing pedological research through literature, discussions, and field trips. Topics include factors and processes involved in pedogenesis, soil mineralogy, and landscape evolution. Students write research proposal or manuscript depending on interest. Prerequisite: Soil 6130/5130; Recommended: Geol 6410/5410. (2Sp 2nd Block)

Biometeorology Courses (Bmet)

BPS 2000. The Atmosphere and Weather. Survey of the processes governing the behavior of the atmosphere and the phenomenon of weather. Basic physical principles of radiation, energy, evaporation, and heat transport are introduced and connected to atmospheric circulation and weather. (3F,Sp)

3250. Aviation Weather. Discussion, observation, and analysis of weather important for pilots and those associated with air travel. (3Sp)

DSC, QI 3820. Global Climatology. Develops general understanding of how the climate of the earth functions. Focuses on the connections of the earth system, along with its inherent variability. Prerequisites: Bmet 2000 or Geog 1130. (4F)

4300. General Meteorology. Introductory meteorology for students with background in physical sciences. Emphasis placed on physical processes (quantitatively) in the atmosphere, resulting in general weather phenomena around the world. Prerequisite: Bmet 2000. (3F)

5250 (d6250). Remote Sensing of Land Surfaces. Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: Basic calculus and physics. (4Sp)

5500 (d6500). Land-Atmosphere Interactions. Examination of interactions between the surface and atmosphere. Consideration of flows of mass and energy in soil-vegetation-atmosphere continuum, and their linkage to local and regional climates. Detailed study of feedbacks between vegetation and atmosphere. (3Sp)

5700 (d6700). Environmental Measurements. Examination of critical instrumentation and principles involved in measuring key properties of terrestrial environment. Consideration of measurements in soils, plants, and atmosphere. (3Sp)

6250 (d5250). Remote Sensing of Land Surfaces. Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: Basic calculus and physics. (4Sp)

6300. Principles of Atmospheric Science. Introduction to fundamental physical principles upon which atmospheric sciences are based. Thorough description and interpretation of wide range of atmospheric phenomena. Prerequisite: Instructor's consent. (3F)

6500 (d5500). Land-Atmosphere Interactions. Examination of interactions between the surface and atmosphere. Consideration of flows of mass and energy in soil-vegetation-atmosphere continuum, and their linkage to local and regional climates. Detailed study of feedbacks between vegetation and atmosphere. (3Sp)

6700 (d5700). Environmental Measurements. Examination of critical instrumentation and principles involved in measuring key properties of terrestrial environment. Consideration of measurements in soils, plants, and atmosphere. (3Sp)

6910. Special Problems in Climatology. Study of physical causes and effects of various climate regimes found upon the Earth. Study of the basis and mechanisms of all types of physically-based climate models. Assists students in comprehending relative complexities and applicabilities of the whole range of climate models. (3Sp) ®

Plants, Soils, and Biometeorology Courses (PSB)

1050. Plants, Soils, and Biometeorology Orientation. Orientation to the teaching, research, and extension programs of the department, and to career opportunities. Optional orientation to a specific major: Horticulture, Crop Science, or Environmental Soil/Water Science. (1-2F)

4250. Internship in Plants, Soils, and/or Biometeorology. Professional internship in crop science, horticulture, environmental soil/water science, and/or biometeorology. (1-4F,Sp) ®

4800. Teaching Practicum for Undergraduate Students. Offers undergraduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. (1-3F,Sp)

CI 4890. Senior Seminar. Student preparation for careers. Familiarization with placement processes. Discussion of role in society and career opportunities for graduates. Experiences in team building. Opportunities for oral presentations of solutions to current issues and scientific information. (1F,Sp) ®

4900. Special Problems. Special topics and problems in crop science, horticulture, environmental soil/water science, and/or biometeorology. Subject, time, and credit arranged individually as needed. Department approval required. (1-4F,Sp,Su) ®

5160. Methods in Biotechnology: Cell Culture. Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. (3Sp)

5240. Methods in Biotechnology: Protein Purification Techniques. Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: Chem 3700. (3Sp)

5260. Methods in Biotechnology: Molecular Cloning. Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: Chem 3700 or Biol 2200; or permission of instructor. (3)

6700. Integrative Topics in Plants, Soils, and Biometeorology. Team-taught special topics course encouraging interdisciplinary analysis of a research or policy area from the current literature, encompassing the three departmental subdisciplines. Emphasis on written and oral student presentations. (1-3F) ®

6800. Graduate Student Teaching Practicum. Offers graduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. (1-3F,Sp)

6890. Plants, Soils, and Biometeorology Graduate Seminar. Review and critique of presentations. Communication practice in extemporaneous, extension, research, poster, and lecture presentations. PSB graduate students must enroll during both fall and spring semesters. (1F,Sp) ®

6900. Special Problems in Plants, Soils, and/or Biometeorology. (1-8F,Sp,Su) ®

6970. Research and Thesis. (1-18F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

7800. Graduate Student Teaching Practicum. Offers graduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. (1-3F,Sp)

7890. Plants, Soils, and Biometeorology Graduate Seminar. Review and critique of presentations. Communication practice in extemporaneous, extension, research, poster, and lecture presentations. PSB graduate students must enroll during both fall and spring semesters. (1F,Sp) ®

7900. Special Problems in Plants, Soils, and/or Biometeorology. (1-8F,Sp,Su) ®

7970. Research and Thesis. (1-18F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Political Science

College of Humanities, Arts and Social Sciences

Head: Professor *Randy T. Simmons*, environmental politics and policy, public choice
Office in Main 320A, (435) 797-1310

Assistant Head: Associate Professor *Carolyn Rhodes*, international relations, comparative politics, European community, trade
Office in Main 320B, (435) 797-1305

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Professors *William L. Furlong*, Latin America, Central America, democratization, development; *Amal Kawar*, comparative politics, Middle East, women and politics; **Associate Professors** *Peter F. Galderisi*, parties, elections, interest groups, research methods, statistics; *David B. Goetze*, political economy, social choice, comparative politics; *Roberta Q. Herzberg*, public choice, health policy, public policy; *Veronica Ward*, international relations, social choice, global environmental issues, conflict and cooperation; **Assistant Professors** *Jing Huang*, Asian political thought, comparative politics, development; *Michael S. Lyons*, U.S. government, Congress, public policy, elections; *Anthony A. Peacock*, public law; **Lecturer** *Carol L. McNamara*, political theory

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in Political Science; BS and BA in Prelaw

Undergraduate Programs

Objectives

The Department of Political Science offers a flexible program to accomplish the following objectives:

1. to provide students with theoretical and factual understanding of government, politics, and political philosophy, nationally and internationally;

2. to develop in students analytic ability, communication skills, and facility with political research methods;

3. to prepare students for effective participation in civic affairs, careers in government and the teaching of government, and graduate study in political science, law, and other fields related to the public sector; and

4. to further the liberal arts education mission of the University and to enrich the educational experiences of students in all programs of study.

Admission and Prerequisite Requirements

Departmental Admission Requirements. Admission requirements for the Department of Political Science include a minimum 2.0 GPA for Political Science majors and a minimum 3.0 GPA for Prelaw majors. Students in good standing may apply for admission to the department.

Prerequisites. It is assumed that students registered for upper-division political science courses have acquired the basic knowledge and information taught in the lower-division courses required for the major. Anyone who wishes to take an upper-division course, but has not had the appropriate prerequisites, should consult with the instructor before registering. Faculty members reserve the right to drop from upper-division courses students who do not meet these requirements.

Graduation Requirements

Political Science Majors. Students must have at least 36 semester credits in the field. These must include PolS 1010, 1100, 2100, 2200, 2350, 3000, and 4990. PolS 4990 is a senior seminar and may be taken as early as the final semester of the junior year. In addition, students must take a minimum of 6 upper-division credits in each of two depth areas (U.S. Government, Comparative Politics, International Relations, or Political Theory). Internship credit does not count toward the depth requirement. A minimum 2.5 GPA in political science courses and a minimum 2.0 overall GPA are required.

Prelaw Majors. Students must have at least 36 credits in political science. These must include PolS 1100, 2350, 3120, 4120, 4130, and 5130. A minimum 3.0 GPA in political science courses and a minimum 3.0 overall GPA are required.

Minor. Students can obtain a minor in political science by completing a total of 18 credits in the field. PolS 1010 is required, as well as three courses from among PolS 1100, 2100, 2200, and 2350. The remaining credits must be from upper-division courses.

Teaching Major. This program is intended exclusively for students seeking careers in *secondary* education. Students must have at least 36 credits in political science courses chosen from a list available from the department and in the *USU Secondary Teacher Education Program Undergraduate Planning Guide* available at the USU Bookstore. A minimum 2.5 GPA in political science courses and a minimum 2.75 overall GPA are required.

Teaching Minor. This minor is designed specifically for students seeking careers in *secondary* education. Students must have at least 18 credits in political science chosen from a list available from the department and in the *USU Secondary Teacher Education Program Undergraduate Planning Guide* available at the USU Bookstore.

Certificate in International Relations. Certificates are intensive programs of study similar to majors, but involving courses in more than one academic discipline. Political science, economics, and business, for example, may be combined. The Political Science Department participates in the International Relations certificate program. It is designed for those planning careers in international business or diplomacy. Information on this certificate is available from the Political Science Department, Main 320.

Internships

The department places approximately 40-45 students in government or related internships each year. Most of these interns work with a member of the Utah delegation to the U.S. Congress in Washington D.C., a member of the Utah Legislature in Salt Lake City, a political campaign, a state or local administrative agency, or a lobbying group. Students in any major, of at least junior class standing, and having a minimum GPA of 3.0 are eligible to apply.

Pi Sigma Alpha

Pi Sigma Alpha is the national honorary political science society. A member must have at least 15 credits of political science with a minimum 3.0 GPA and a minimum 3.0 GPA overall.

Financial Support

The Political Science Department offers a number of scholarships yearly to students. Contact the College of Humanities, Arts and Social Sciences dean's office for applications (usually available around the first week of January and due back the first week of March) at (435) 797-1195 or visit the college office in Main 338.

Graduate Programs

Departmental Admission Requirements

Applicants must have a BS or BA degree. An undergraduate GPA of 3.0 or better, **or** a GPA of 3.5 or better over the last 90 semester credits of undergraduate coursework is required. Students must have quantitative, verbal, and analytical GRE scores at or above the 50th percentile. Applicants with very high GPAs and other exceptional supporting materials may petition for admission with deficient GRE scores. The graduate admissions committee will review petitions individually.

International students must receive a score of 550 or better on the TOEFL exam.

Due to limited space, acceptance into Political Science graduate programs is not guaranteed, even for students who meet admission requirements. Moreover, all students are expected to perform at high levels throughout their program. Any student receiving a *C* grade or lower for any course at any level **or** a grade point average below 3.0 for a given semester will be placed on

academic probation. Receipt of two grades of *C* or lower or a grade point average below 3.0 for two semesters will result in termination from the program. In addition, students must meet the requirements of the School of Graduate Studies. Applicants not meeting minimum requirements may be allowed to correct deficiencies concurrently with graduate coursework.

Applications will be considered throughout the year. However, students who wish to be considered for financial aid must submit applications by **March 15** for the coming academic year.

No application will be considered until all required information arrives in the office of the School of Graduate Studies.

Assistantships

The department appoints a number of teaching assistants, each with a $6,500 annual stipend. Appointments are for one year, but are renewable for a second year. Research assistantships and government internships are sometimes available as well. Applications are available from the Political Science Department and are due on March 1.

Course Requirements

Students must choose between two tracks: (1) **Public Choice and Public Policy** or (2) **Comparative and International Change.** Course requirements differ according to the track chosen. All students, however, must take PolS 6010, which is the foundation course for the program.

Public Choice and Public Policy. Students in this track must complete the following courses: PolS 6030 and 6040. In addition, students must complete 3 credits chosen from the following list: PolS 5110, 5130, 5180, and Econ 5500. Students must also take at least one course from the **Comparative and International Change** track.

Comparative and International Change. Students in this track must complete PolS 6220. In addition, students must complete 6 credits chosen from the following list: PolS 5200, 5210, 5230, 5270, 5290, 5350, and 6030. Students must also take at least one course from the **Public Choice and Public Policy** track.

For both tracks, the remaining 15 credits needed for the graduate degree may be comprised of: (1) up to 3 credits of PolS 6810; (2) up to 6 credits of PolS 6910 (subject to approval); (3) up to 3 credits of PolS 6920 (subject to approval); (4) up to 3 credits of approved graduate courses outside of Political Science; and (5) other Political Science graduate courses. No more than 15 semester credits of 5000-5990 coursework may be used for a graduate degree.

Political Science Courses (PolS)

BSS 1010.[1] Government and the Individual. Introduction to political science. Origin and justification of government. How and why people get involved in politics. Different forms of government. Government and public policy. Emphasizes basic ideas and theories. (3F,Sp)

BAI 1100. United States Government and Politics. U.S. Constitution, political parties and elections, interest groups, Congress, president, bureaucracy, courts, and civil rights and liberties. This course meets the Americanization requirement. (3F,Sp)

2100.[2] Introduction to International Politics. Analysis of the nation-state system as well as interdependence of the global community. (3F,Sp)

BSS 2200.[2] Comparative Politics. Comparisons of differences in political culture, institutions, and processes, including authoritarian and democratic systems, violence and corruption, political development, and public policy. (3F,Sp)

2350. Introduction to Political Theory. A survey course covering ancient and modern political theory. (3F,Sp)

QI 3000.[3] Introduction to Political Research. Methodology, methods, and approaches used to study and analyze political events and relationships, including the use of library resources. Prerequisite: Stat 1040 or Math 1030. (3F,Sp)

***3100. Global Interdependence.** The origins and consequences of conflict and cooperation in an interdependent global community are examined in order to analyze how transnational, as well as competing national, interests and institutions affect economic, political, and environmental choices and outcomes. (3F)

****DSS 3110. Parties and Elections.** Political parties, campaigns, and elections. (3Sp)

DSS 3120. Law and Politics. Examines history, processes, and theories underlying American law and politics. Makes selective comparison of the American legal system with other legal systems. (3F)

DSS 3130. United States Legislative Politics. Legislative process. (3Sp)

***DSS 3140. The Presidency.** Examines the origins, purposes, and scope of the executive power in the American constitutional system. (3F)

3150. State and Local Government. Includes state and local politics, in addition to metro-urban politics. (3Sp)

3160. Practicing American National Government. Includes survey of legislative, executive, and judicial governing. Offers academic basis for Washington DC experience. (3F,Sp,Su)

DSS 3190. Women, Power, and Politics. Examines the uses of power and the participation of women in politics cross-culturally and in different regimes. (3F)

****DSS 3210. Western European Government and Politics.** Britain, France, Germany, Scandinavia, and the European Union. (3F)

***DSS 3220. Russian and East European Government and Politics.** (3F)

****3230. Middle Eastern Government and Politics.** General overview of political cultures and political developments in the Middle East. (3F)

DSS 3250. Chinese Government and Politics. (3F)

DSS 3270. Latin American Government and Politics. Survey of most of the governments and politics of Latin America, emphasizing events, policies, and governmental actions of the past decade. (3F)

DSS 3310. American Political Thought. Survey of American political thought from colonial times to the present. (3F)

DSS 3400.[4] United States Foreign Policy. Formulation, execution, and impact of United States foreign policy. (3F,Sp)

3430. Political Geography. The relationship between earth and state. World political phenomena studied from a geographic point of view, including international boundaries, territorial seas, and landlocked states. (3Sp)

DSS 3810. Introduction to Public Policy. Examines different approaches to the study of public policy and different value dimensions in the design of policies. (3F)

4000.[5] Political Analysis. Political data, quantitative and analytical techniques. Prerequisite for majors: PolS 3000. (3F)

4120. American Constitutional Law I. Governmental powers, separation of powers, checks and balances, federalism, and due process of law. (3F)

4130. American Constitutional Law II. Equality and Bill of Rights protections. (3Sp)

****4210. European Union Politics.** Explores creation and ongoing development of the European Union. Examines governing institutions, and internal and external politics of the European Union across a number of issues areas. (3Sp)

CI 4220.[5] Ethnic Conflict and Cooperation. Examines origins of ethnic groups and the causes of ethnic conflicts, as well as different strategies for preventing or resolving such conflict. Explores conditions facilitating interethnic cooperation, the more common form of ethnic group interaction. (3Sp)

****4230. Issues in Middle East Politics.** Contemporary Middle Eastern political movements, regional conflicts, and state-level political change. (3Sp)

***4260. Southeast Asian Government and Politics.** (3Sp)

***4280. Politics and War.** Examines causes and implications of war. Study of wars from general to limited, including case studies such as the Vietnam War. (3Sp)

4310. History of Political Thought I. Issues and thinkers in ancient and medieval political thought. (3Sp)

***DSS 4320. History of Political Thought II.** Issues and thinkers in modern and contemporary political thought. (3Sp)

***4410. Global Negotiations.** Creates an awareness of international issues and other cultures. Utilizes a computer simulation program in which negotiating teams of students from around the world are linked in a negotiation simulation. (3Sp)

****DSS 4440. Gender and World Politics.** Examines the role gender inequality plays in the construction of international relations, using a variety of feminist approaches. Central theme of gendered critique is global security, defined in terms of economic, ecological, political, and military dimensions. (3Sp)

CI 4450. United States and Latin America. Study and analysis of foreign relations of Latin American nations among themselves and with the rest of the world. (3Sp)

***4460. National Security Policy.** How intelligence systems function, fit within the policymaking systems of free societies, and are managed and controlled. (3Sp)

***4470. Foreign Policy in the Pacific.** Analysis of contemporary foreign policies of major countries surrounding the North Pacific. (3Sp)

****4480. International Trade Policy.** Examines governance and politics of international trade relations, focusing in particular on cooperation, conflict, and dispute resolution in the GATT/WTO, European community, NAFTA, and Asian cooperative regimes. (3Sp)

4810. Politics and Public Policy. Explains public policies as rational expressions of political self-interest and explores the relationship between self-interest and values such as “equity” and “efficiency” in policy. (3F)

****DSS 4820. Natural Resources and Environmental Policy: Political Economy of Environmental Quality.** Causes of environmental and natural resources problems and evaluation of political and private responses to them. Study of economics and politics applied to the environment. Production, protection, and allocation of scarce resources by markets and political systems. (3Sp)

4890. Special Topics. Credit arranged. Instructor's permission required. (1-5F,Sp) ®

4910. Readings and Conference. Individually directed study in subjects of special interest to students. Credit arranged. Instructor permission required. (1-5F,Sp,Su) ®

CI 4990. Senior Research Seminar. Introduces students to the research process by having them complete a major research project in the topic area of the particular professor. (3F,Sp) ®

****5110. Social Policy.** Examines health, education, and welfare policies in U.S. contexts and in comparative context. (3F)

5120. Economics of Russia and Eastern Europe, 9th Century to 21st Century. Development of the economics of Russia and Eastern Europe from earliest times to the present, emphasizing the interaction between economic forces and policies of the state. Prerequisite: Econ 2010. (3F)

5130. Law and Policy. Analyzes the relationship between law and the formation and implementation of policy. (3Sp)

****5180. Natural Resource Policy.** Political and economic theory applied to the analysis of natural resource allocation conflicts and U.S. policies enacted to resolve such conflicts. (3Sp)

***5200. Global Environment.** Examines different strategies for resolving global resource and environmental problems. (3F)

***5210. Comparative Political Change/Development.** Emphasis on approaches and theories in the field of comparative politics, with a focus on political change/development. (3F)

***5230. Development in the Middle East.** Study of Middle Eastern regimes, political cultures, and political developments. (3Sp)

5270.[5] Latin American Politics and Development. Focuses on special contemporary issues of selected Latin American nations, such as democratization, the role of the military, and elections. (3Sp)

5290.[5] Development in Europe. Emphasizes political and economic development in Europe. (3Sp)

***DSS 5350. Evolution, Conflict, and Cooperation.** Intensively examines human cooperation as a fundamental problem of development and human conflict as the major obstacle to development. (3Sp)

5910. Campaign Internship. A semester campaign internship. Instructor approval required. (2-15F,Sp,Su) ®

5920. Washington Internship. A semester congressional, administrative, or legal internship in Washington, D.C. Instructor approval required. (2-15F,Sp,Su) ®

5930. State Government Internship. A semester legislative, lobbying, or administrative internship in the state government of Utah or those of any other state government. Instructor approval required. (2-15F,Sp,Su) ®

5940. Administrative Internship. A semester administrative internship at the local or state level. Instructor approval required. (2-15F,Sp,Su) ®

6010. Scope and Methods of Political Science. A graduate survey of the philosophy and methods of political analysis. Topics ranging from the methodology of inquiry to elementary statistical methods will be covered. (3F)

***6030. Political Theory, Political Economy, and Capitalism.** Provides an introduction to the study of political economy by considering the connections among political theory, political economy, and capitalism. (3Sp)

***6040. Public Choice.** Introduction to applying the microeconomic theory of markets to political processes. (3F)

****6220. International Relations Theory.** Reading seminar on theory and method in the interplay of politics and economics in international relations. (3F)

6810. Graduate Seminar. American politics; comparative politics; political theory; international politics; public law; public administration. (1-4F,Sp,Su) ®

6910. Graduate Tutorial. Prerequisite: instructor's consent. (1-3F,Sp,Su) ®

6920. Internship. Internship in a public administration agency. Instructor approval required. (1-15F,Sp,Su) ®

6970. Thesis Research. Prerequisite: admission to candidacy. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

[1]Taught Fall 1998 and 1999, and Spring 1999.

[2]Taught Fall 1998 and Spring 1999 and 2000.

[3]Taught Spring 1999 and Fall 1999.

[4]Taught Fall 1998 and 1999, and Spring 2000.

[5]Not taught 1998-99 or 1999-2000.

Department of
Psychology

College of Education

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Graduate Program Coordinators: Combined Clinical/Counseling/School PhD—Associate Professor *Susan L. Crowley*, counseling; **Research and Evaluation Methodology PhD—Professor** *Blaine R. Worthen*, research methodology; **School Psychology MS—Assistant Professor** *Gretchen A. Gimpel*, school; **School Counseling MS—(Acting Co-Coordinators) Professor** *David M. Stein*, clinical, and **Professor** *Keith T. Checketts*, counseling

Professors *Frank R. Ascione*, developmental; *Keith T. Checketts*, school psychology and counseling, research methodology; *Carl D. Cheney*, physiological; *John R. Cragun*, industrial; *Marvin G. Fifield*, school and counseling; *Cecilia H. Foxley*, counseling, human relations; *J. Grayson Osborne*, behavior therapy, child; *Richard N. Roberts*, developmental; *Charles L. Salzberg*, applied behavior analysis; *Sebastian Striefel*, clinical child; *Karl R. White*, research methodology; **Professors Emeriti** *Michael R. Bertoch*, counseling; *Glendon W. Casto*, developmental; *Arden N. Frandsen*, educational; *Richard B. Powers*, experimental social; *David R. Stone*, learning, educational; **Associate Professors** *Susan L. Crowley*, counseling; *Tamara J. Ferguson*, social psychology; *Kevin Masters*, clinical; *Lani M. Van Dusen*, educational psychology, research methodology; **Research Associate Professors** *Byron R. Burnham*, qualitative evaluation methods; *Mark S. Innocenti*, school psychology; **Associate Professors Emeritus** *William R. Dobson*, clinical; *Elwin C. Nielsen*, clinical and school; **Assistant Professors** *Xitao Fan*, psychometrics, quantitative methods; *Gretchen A. Gimpel*, school; *Carla J. Reyes*, professional-scientific; **Research Assistant Professor** *Gary W. Mauk*, developmental and school; **Assistant Professor Emeritus** *J. Whorton Allen*, counseling; **Adjunct and Clinical Faculty** *Kent W. Anderson*, professional-scientific; *J. Milo Andrus*, psychiatry; *Ann M. Berghout Austin*, infancy through childhood; *Richard D. Baer*, experimental child; *Carolyn G. Barcus*, counseling; *David W. Bush*, clinical/counseling; *Curtis R. Canning*, psychiatry; *Phyllis Cole*, clinical child/school; *Gwenaelle C. Couillard*, training; *Mary E. Doty*, clinical; *Debra Durso-Cupal*, research and evaluation methodology; *Laura B. Fisher*, psychiatry; *Steven M. Gentry*, child and family; *Marilynne T. Glatfelter*, clinical; *Richard D. Gordin, Jr.*, sport and exercise psychology; *Ronald Houston*, clinical; *Bruce R. Johns*, clinical child; *Randall M. Jones*, family research management; *Joan A. Kleinke*, counseling and personnel services; *J. Russell Mason*, sensory evaluation, ethology; *Glen H. Maw*, counseling; *Kenneth W. Merrell*, school psychology; *Kent E. Nabers*, graduate assistant; *Mark A. Nafziger*, counseling psychology; *Janis G. Neece*, counseling; *John A. Neece*, counseling; *D. Kim Openshaw*, marriage and family therapy; *Calvin R. Petersen*, clinical; *Lori A. Roggman*, developmental; *Thomas R. Schenkenberg*, neuropsychology; *Patricia L. Truhn*, neuropsychology, crisis intervention; *JoAnn T. Tschanz*, neuropsychology; *Leland J. Winger, Jr.*, clinical; *Jean Wollam*, educational psychology

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Psychology

Graduate specializations: *MS, MA*—School Psychology, School Counseling; *PhD*—Combined Professional-Scientific Psychology (Clinical, Counseling, and School), Research and Evaluation Methodology

Undergraduate Programs

Objectives

Psychologists utilize research methods to understand the causes of behavior, emotion, and thought processes. Psychologists specialize in diverse areas. Some psychologists seek to better understand the interactions between genetic, biological, social, and psychological determinants of behavior. Other psychologists are concerned with how the body and brain create emotions, memories, and sensory experiences, and how these are perceived and interpreted. Still others are concerned about how we learn observable responses and how we process, store, and retrieve information. Additionally, psychologists focus their careers on the causes, assessment, and/or treatment of emotional and behavioral disorders.

The Department of Psychology at USU offers a rich undergraduate program in psychology with the primary objectives being:

1. To provide students with substantive knowledge in the basic discipline of psychology, such as history/systems, basic behavior processes, biological bases of behavior, development, personality, learning and cognition, social influences on individuals, research methods, and psychological disorders and treatment.
2. Teaching students how to critically analyze and solve problems pertaining to human interaction, communication, and relationships.
3. Student mastery of principles relating to the causes of behavior, basic learning processes, and the measurement and analysis of behavior.
4. Training students to use scientific and quantitative methods to better understand and apply social science research.
5. Preparing students to compete successfully for entry into nationally and internationally recognized graduate programs in the social sciences.
6. Preparing majors and minors to compete successfully for postbachelor employment opportunities in private/public education, human services, government, and corporations.

The courses in Psychology and the electives available in related departments allow students to tailor their education to meet specific career goals. Some students who major in psychology may qualify for admission to unique specialty tracks: (1) **the (secondary education) Teaching Major**; (2) **Behavior Analysis Skill Track**; (3) **Interpersonal Relationships Skill Track**; and (4) **Graduate School Preparation Track**. A human services/caseworker training option may also be available to majors.

Students can complete the major or minor in psychology either on-campus (Logan), or through the USU Distance Education system (all required courses and selected electives are offered every 1-2 years). The specific requirements for the skill tracks, the Apprenticeship, the on- and off-campus (distance education) options, and for how psychology electives can be used to advance students' career goals can be obtained from the **Psychology Advisement Office, Eccles-Jones Education Building, Room 475, (435) 797-1456**.

Requirements

Departmental Admission Requirements. Students are admitted to the Department of Psychology as Prepsychology majors by meeting the Utah State University admission requirements (see pages 43-46). To be a Psychology major, a student must make written application to the department, after meeting the following prerequisites: (1) completion of at least 40 semester credits with a cumulative GPA of 2.5 or higher; (2) completion of at least 18 credits of the University Studies requirement with a GPA of 2.5 or higher; and (3) completion of Psy 1010, 1100, 1400, and 1410 with a GPA of 2.75 or higher. Application to the department should be made during the semester in which these prerequisites will be completed.

General Undergraduate Psychology Major:

Required Courses (22 credits), plus
Primary Electives (13 credits),
Secondary Electives (6 credits), and
Apprenticeship (6 credits)

Requirements for a psychology major consist of a broad preparation of 22 credits of specified coursework, plus a minimum of 19 credits of approved Psychology elective courses, and 6 credits of an apprenticeship, which allows for integration of coursework knowledge (theory) through application, for a total of 47 credits. The specific courses required are: Psy 1010, 1100, 1400, 1410, 2800, 3500, 5100, 5330 (22 credits). Primary electives are: Psy 3210, 3510, 4210 (choose 6 credits); Psy 3460 or Biol 3020 or Psy 3450 (choose 3 credits); Psy 3400, 4420 (choose 4 credits). Secondary electives are: Psy 1210, 2100, 3660, 4230, 4240, 4510, 5200, Psy/FHD 3120, Psy/PEP 4000, Psy/PEP 5050, Psy/ComD 5670, Psy/SpEd 5720 (choose 6 credits). Required Apprenticeship courses are: Psy 5950, 5960 (6 credits). A minor is required. A minimum overall GPA of 2.5 is required for graduation, with a minimum GPA of 2.75 in Psychology. (Students desiring certification for teaching in secondary schools must also meet the requirements of the Secondary Education Department.)

Undergraduate Psychology Minor:
Required Courses (10 credits), plus
Elective Courses (9 credits)

For a Psychology Minor, students must complete the following courses (10 credits): Psy 1010; Psy 1100 or 2100; Psy 1400, 1410. Also, 9 credits must be selected from courses listed for the Psychology major. The student's grade point average for all psychology courses, USU or transfer, must average 2.75 or above to qualify for credit towards the minor.

Psychology Teaching Major:
Required Courses (22 credits), plus
Elective Courses (19 credits)

Requirements for a Teaching Major in Psychology broadly consists of 22 credits of specified coursework and 19 credits of (primary and secondary) elective Psychology coursework. At least 41 Psychology credits must be completed for the Psychology Teaching Major (i.e., 22 credits must be taken in upper-division Psychology courses, 12 of which must be taken at USU). A minor in another field of study is also required. Prospective teachers must complete 35 credits of Professional Education Framework in the Department of Secondary Education.

Skill Tracks for Undergraduate Majors in Psychology

The following skill tracks can be completed as part of a student's major in Psychology. A skill track represents a cluster of courses that help provide more comprehensive knowledge and practical skill in particular areas. After admission as a major in Psychology, students may apply for admission to a skill track. Completing a skill track requires careful planning, so that skill track courses and all other required and elective courses for the major are fulfilled. Enrollment in a skill track is entirely optional for majors.

Behavior Analysis Skill Track. The following cluster of courses will provide psychology majors with a basic foundation in experimental and applied behavior analysis: Psy 1400, 1410, 3400, 4910, 5720; SpEd 5010, 5050; Biol 3010; and Phil 4320 or 4900.

Interpersonal Relationships Skill Track. The following cluster of courses will assist psychology majors in systematically developing a broad range of interpersonal relationship skills, such as listening, assertiveness, negotiation, conflict resolution, anger management, etc.: Psy 1210, 3210, 3510, 4210, 4510, 5200; MHR 3710.

Graduate School Preparation Track. The major in Psychology has been designed so that students take classes that will help them compete in applying for graduate school. Students completing the graduate school track need to become actively involved with faculty research, form an association with Psi Chi, and enroll in independent research and readings courses. Students should also take a course covering use of statistical software (e.g., SPSS), offered through FHD or Sociology. Furthermore, it is recommended that students take at least one upper-division course in statistics from Psychology, FHD, or Sociology.

Psychology Courses Fulfilling University Studies Requirements

The following Psychology courses may be used to fulfill University Studies requirements, in the areas indicated:

Breadth Social Sciences (BSS): Psy 1010.
Depth Social Sciences (DSS): Psy 3210, 3400, 3500, 3510, 4210, 4230, 4240, 4420.
Communications Intensive (CI): Psy 4510, 5200, 5950, 5960.
Quantitative Intensive (QI): Psy 2800.

Graduate Programs

Admission Requirements

Admissions requirements vary somewhat across Psychology graduate programs. However, applications submitted to the School of Graduate Studies must include the following: (1) transcript showing completion of undergraduate course prerequisites, plus any recommended coursework; (2) report of (GRE) test scores from ETS; (3) GPA of at least 3.2, covering the last 60 semester credits; (4) three letters of recommendation; (5) a statement of professional goals and intent; and (6) a vita. The department requires a minimum GRE combined (Verbal and Quantitative) score of at least 1,100 for all programs.

The deadline for submitting applications for psychology PhD programs is **February 1.** The application deadline for the MS School Psychology program is **March 1**. Applications for the MS program in School Counseling must be submitted by **April 1.** With the exception of the PhD program in Combined Clinical/Counseling/School, applications for programs may be accepted after these dates if openings still exist.

Students are normally admitted to Psychology master's degree programs, including School Psychology and School Counseling, following completion of a bachelor's degree. Prospective PhD program students can compete for admission to the Combined Clinical/Counseling/School program or the Research and Evaluation Methodology program if they possess either a bachelor's *or* a master's degree.

Prerequisites for Admission to Graduate Programs

Applicants to the Master of Science (MS) and Doctor of Philosophy (PhD) program are advised that they should possess a broad base of knowledge at the undergraduate level in *a substantive subgroup* of the following: general psychology, human development, analysis of behavior, personality theory and research, psychometrics, elementary statistics, history and systems, physiological, sensation and perception, and social psychology. The absolute prerequisites for each graduate program are outlined below, along with a listing of graduate program course requirements for each program.

Psychology MS Programs

School Psychology, NASP-accredited

USU's nationally accredited program in school psychology emphasizes child development issues, emotional/behavioral disorder assessment and treatment, and traditional psychoeducational assessment and consultation activities appropriate to school settings. The program is approved by the Utah State Office of Education for certification of school psychologists. Students are required to complete either a research thesis (Graduate School Plan A option), or a major literature review/synthesis paper (Plan B).

Absolute undergraduate course prerequisites for admission to the MS in School Psychology are as follows: (1) *Elementary Statistics*; (2) *Theories/Research in Learning*; (3) *Abnormal Psychology*; and (4) *Theories/Research in Personality*.

The MS in School Psychology requires **63 total semester credits for Plan A** and **68 total semester credits for Plan B**. The following courses are required: Psy 6150, 6220, 6290, 6310, 6330, 6340, 6350, 6360, 6380, 6410, 6450, 6460, 6500, 6530, 6570; Psy 6650 or 6660; Psy 6880, 6890, 6950; and Psy 6970 (3-6 credits). The following courses are required for *Plan A only*: Psy 6600; SpEd 5040.

School Counseling

This program has been designed to help students earn an MS

degree in psychology, with appropriate coursework for certification as a school counselor. School counselors are commonly employed by public and private elementary and secondary schools to provide educational/vocational guidance and counseling services. The program is approved by the Utah State Office of Education. It is offered both on campus in Logan, and via a live, video distance education system (EDNET). This program is not designed to meet the requirements for the Professional Counselor license (mental health).

Absolute undergraduate course prerequisites for admission to the MS in School Counseling are as follows: (1) *Developmental Psychology*; (2) *Abnormal Psychology*; and (3) *Theories/Research in Personality.*

The MS in School Counseling requires **43 total semester credits**. The following courses are required: Psy 6220, 6240, 6250 (10 credits), 6260, 6290, 6330, 6340, 6350, 6370, 6460, 6530, 6660.

PhD Programs

Combined Clinical/Counseling/School (Professional-Scientific) Psychology, (APA-accredited)

This program integrates the theory and practice of psychology common to the disciplines traditionally denoted as clinical, counseling, and school psychology. The program subscribes to a scientist-practitioner model, though it is recognized that students completing the program will commonly enter professional practice in VA hospitals, mental health centers, hospitals, clinics, etc. The program provides an excellent balance of research training and practitioner skills. Entering BS students can opt to earn either an MS degree in counseling psychology or school psychology prior to the PhD. A research thesis and dissertation are required of all students. Key faculty emphasis areas of the program include child-clinical/school/family psychology, and health/behavioral medicine. The program is also affiliated with the American Indian Support Project, one of the nation's most successful programs for training and mentoring American Indian PhD psychologists.

Absolute undergraduate prerequisites for admission to the PhD program in Combined Clinical/Counseling/School are as follows: (1) *Elementary Statistics*; (2) *Theories/Research in Learning*; (3) *Abnormal Psychology*; and (4) *Theories/Research in Personality*.

The Professional-Scientific PhD requires **103 total semester credits**, including the following: (1) *MS counseling psychology degree curriculum:* Psy 6150, 6260, 6290, 6310, 6320, 6350, 6360, 6570, 6600, 6880, 6970; and (2) *PhD program courses:* Psy 6220, 6510, 6530, 6610; Psy 6650 or 6660; Psy 7100, 7250, 7270, 7350, 7360, 7370, 7670, 7910, 7950, 7970; 6 credits of electives. **Note:** The MS counseling psychology degree is available *only* to students matriculated into the PhD Clinical/Counseling/School program.

Research and Evaluation Methodology

In cooperation with the College of Education's Interdepartmental Doctoral Program, the department offers a specialization in research and evaluation methodology. The program is designed to produce specialists in research and evaluation methodology capable of contributing to the knowledge base in psychology and education, and of evaluating programs, products, and processes employed in these two fields. While satisfying the department's general requirements, students may design their programs to become specialists in evaluation, applied research, basic research, or functional combinations of these roles. A research thesis and dissertation are required of all students.

Absolute undergraduate prerequisites for admission to the PhD program in Research and Evaluation Methodology are as follows: (1) *Elementary Statistics*; (2) *Psychometrics*; and (3) *History and Systems of Psychology.*

The Research and Evaluation Methodology PhD requires **72-92 total credits**, including the following: (1) **REM MS degree curriculum:** Psy 6010, 6510, 6530, 6570, 6600, 6610, 6650, 6660, Educ 6770; Psy 6970 (8-14 credits); (2) **REM PhD degree curriculum:** SpEd 5050, Psy 6930, 7020, 7050, 7060, 7070, 7080, 7090, 7250, 7670, 7700, 7810, 7900, 7910 (a-c), 7970; InsT 6910, 7910 (a-c), 7920, 7970.

Additional Requirements for Psychology PhD Programs

All PhD candidates must meet the following general core requirements, regardless of specialty emphasis: (1) submission of an article for publication in a recognized journal; (2) presentation of research findings at a regional or national convention or professional meeting; (3) completion of the doctoral dissertation; and (4) completion of the statistics and research core. Students in the Professional-Scientific PhD program must also complete a formal case presentation, and compete nationally for admission to an APA-approved, 2,000-hour predoctoral internship. The REM program has an additional requirement of a formal grant proposal.

Research Opportunities for Students

Departmental faculty are heavily involved in programmatic research. A sampling of the diverse research interests of tenured and tenure-track faculty available to students includes: *Ascione*—prosocial, moral development, domestic violence, relation between cruelty to animals and psychopathology; *Checketts*—school counseling effectiveness, assessment of academic performance; *Cheney*—behavioral pharmacology, basic operant learning; *Crowley*—anxiety, depression, assessment of affective functioning; *Fan*—quantitative methods, psychometrics; *Ferguson*—social skills, guilt/shame development, social cognition; *Gimpel*—ADHA, behavioral disorders of children; *Masters*—exercise and health, health psychology, therapy outcome, religion and health; *Osborne*—experimental and applied behavior analysis; *Reyes*—prevention for at-risk children and families, ethnic minority issues, sexual abuse/trauma; *Roberts*—early intervention with families of young children, community-based systems of services; *Stein*—addictive behaviors and models, eating disorders assessment and treatment, eating behavior and longevity; *Striefel*—biofeedback, stress management, developmental disabilities, poverty and self-sufficiency; *Turner*—behavioral medicine, eating disorders development and treatment; *Van Dusen*—human memory and cognition, text comprehension, learning styles; *White*—educational research, hearing loss detection in infancy and impact on development; *Worthen*—evaluation and research methdology in education, government, and organizations.

Graduate Student Financial Assistance

Financial support for students enrolled in terminal MS programs is limited. MS students should meet with their academic adviser for information about possible assistantship opportunities. The MS program in school psychology has had several training grant stipends available to select students.

PhD students are guaranteed an assistantship for at least their first year. However, for at least the last 15 years, 100 percent of PhD students have continued to enjoy assistantship support beyond their first year, if they desired it. The department has available a number of teaching assistantships. Though these are generally awarded to students matriculated in psychology PhD programs, they are occasionally given to exceptional MS students. Also, faculty in the department and college regularly offer research assistantships to graduate students, as does the Counseling Center and a variety of on- and off-campus facilities (e.g., Center for Persons with Disabilities, Logan Regional Hospital, Bear River Mental Health Center, Head Start, and Early Head Start). Additionally, first-year psychology PhD students typically compete extremely well for several University Fellowships, which were established to attract top student scholars to USU. Finally, the department has some scholarship support specifically available to psychology graduate students (e.g., Walter Borg Scholarship).

Psychology Courses (Psy)

BSS 1010. General Psychology. Explores basic areas of psychology, and how each explains human thought and behavior at the individual, familial, and cultural levels. (3F,Sp,Su)

1100. Developmental Psychology: Infancy and Childhood. Introduction to psychological development with emphasis on perceptual, language, cognitive, and social development in children. Prerequisite: Psy 1010. (3F,Sp,Su)

1210. Psychology of Human Adjustment. Examination of life situations affecting human adjustment to everyday living, with emphasis on practical applications. Prerequisite: Psy 1010. (3Sp,Su) ©

1220. Career and Life Planning. Students assess and clarify their interests, values, skills, and temperaments. Emphasizes discovering relationships between these personal characteristics and the realities of educational and employment opportunities. Explores setting goals, creating action plans, and coping with change. (3F,Sp)

1400. Analysis of Behavior: Basic Principles. A laboratory course about the scientific methods used in the study of animal and human behavior. Prerequisite: Psy 1010. (3F,Sp,Su)

1410. Analysis of Behavior: Basic Principles Lab. Laboratory experience accompanying Psy 1400. Prerequisite: Psy 1010. (1F,Sp,Su)

1730. Strategies for Academic Success. Orients students to the systems, tools, and resources unique to higher education that are needed to maximize academic success (e.g., library, computer lab use, etc.). Also helps students develop critical thinking, study, and learning strategies necessary for college success. (1-3F,Sp)

1750. Comprehension Strategies for College Reading. Practical course emphasizing application of strategies and development of critical thinking skills needed to comprehend and distill meaning from college-level texts. (2F,Sp)

2100. Developmental Psychology: Adolescence. Characteristics of adolescents and their psychological, educational, and adjustmental problems are discussed in detail. Prerequisite: Psy 1010. (3F,Sp,Su)

2250. Introductory Cooperative Work Experience. Educators and employers cooperate to provide opportunities for students to apply classroom theory and principles in job environments, thereby gaining practical experience in their field. Prerequisite: Approval of Psychology Department coop education counselor. (1-6F,Sp,Su)

QI 2800. Psychological Statistics. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed for each current type of educational and psychological literature. Prerequisite: Stat 1040. (3F,Sp)

3120. Abuse and Neglect. Students examine causes, treatment, and laws associated with family violence, including child abuse and neglect, partner abuse, and elder abuse. Prerequisite: FHD 1500 or Psy 1100. Also taught as FHD 3120. (3F,Sp) ©

DSS 3210. Abnormal Psychology. Introduction to "abnormal" human behavior. Covers characteristics, etiology, and treatment of a variety of psychological disorders. Prerequisite: Psy 1010. (3F)

DSS 3400. Analysis of Behavior: Advanced. In-depth examination of principles introduced in Psy 1400. Considers principles governing more complex human and animal behavior, as well as emotional and motivational factors in behavior. Lab included. Prerequisite: Psy 1400. (4Sp)

3450. Perception and Psychophysics. Analysis of how sensory processes and principles help determine behavior. Introduction to methods used to measure sensory-determined behavior. Methods, results, and principles of sensory communication. Lab required. Prerequisite: Psy 1010. (3Sp)

3460. Physiological Psychology. Introductory course examining relationship between central system anatomy and physiology, and behavior and emotional functioning. Also considers neural and biochemical substrates of behavior. Prerequisite: Psy 1010. (3F)

DSS 3500. Scientific Thinking and Methods in Psychology. Social science research is commonly reported by the media, and by political and governmental interests. Students learn how to legitimately interpret such research through a study of accepted research methods and analysis procedures, and through critical study of the common interpretive mistakes made by media writers. Prerequisite: Psy 1010. (3F,Sp)

DSS 3510. Social Psychology. Study of the individual in society; problems, theories, and methods of social psychology; will relate reading assignments to current social issues. Prerequisite: Psy 1010. (3F)

3660. Educational Psychology for Teachers. Principles and practices for development of conditions for effective learning. Lab required. Prerequisites: Psy 1010, and Psy 1100 or 2100. (2F,Sp)

4000. Mental Aspects of Sports Performance. Provides an understanding of theory and applications in the specialty area of sports psychology, including enhancement of motivation and performance, stress, anxiety, aggression and time management, and the relation of these issues to physical development and coaching styles. (3F)

DSS 4210. Personality Theory. Explanatory study of various personality theories, their origin, and approaches to the understanding of human behavior. Prerequisites: Psy 1010 and 2800. (3Sp)

DSS 4230. Psychology of Gender. Critical analysis of evidence for sex differences, gender roles, the effect of gender on traditional psychology, and other topics, including parenthood, cultural influence, and sexual orientation. (3Sp)

DSS 4240. Multicultural Psychology. Explores cultural influences on basic psychological processes, including perception, cognition, language, emotion, intelligence, attitudes, values, and intergroup relations. Prerequisite: Psy 1010. (3F)

4250. Advanced Cooperative Work Experience. Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. Prerequisite: Approval of Psychology Department cooperative education coordinator. (1-12F,Sp,Su) ®

DSS 4420. Cognitive Psychology. In-depth study of basic concepts, methods, and theories involved in perception, memory, and thinking. Lab required. Prerequisite: Psy 1010. (3F)

4430. Cognitive Psychology Laboratory. Required laboratory, designed to

accompany Psy 4420. Focuses on conducting cognitive experiments via computer simulations and sampling data collection. Designed to increase skills in designing data collection and interpreting experimental data. (1Sp)

4500. Teaching Methods in the Social Sciences. Students learn special techniques for instructing students in social science theory, research, and methodology, particularly in psychology. Prerequisite: Matriculation in psychology Teaching Major, enrollment in other social science pre-teacher program, or consent of instructor. (3Sp)

CI 4510. Social Skills Practicum. Examination of theory and practice of social skills training with children, adolescents, and adults. Prerequisites: Psy 1010, 1100, and either Psy 3210 or 3510. (3F)

4910. Undergraduate Research Creative Opportunity. A cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. Prerequisite: Approval of Psychology Department URCO coordinator. (1-3F,Sp,Su) ®

4920. Practicum. Field work in applied psychological setting at BS level. (1-3F,Sp,Su) ®

5050 (d6050).[1] Psychological Aspects of Sports Performance. Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. (3Sp)

5100. History and Systems of Psychology. Theoretical and historical developments in psychology with primary emphasis on nineteenth and twentieth century developments, although earlier precursors are also considered. Prerequisite: Psy 1010. (3Sp)

CI 5200. Introduction to Interviewing and Counseling. Theory, models, and practice in basic principles of interviewing and counseling, including listening skills, facilitation of verbal interaction, gathering information, attending to nonverbal behavior, interpersonal dynamics, and promoting helping relationships. Prerequisites: Psychology major or minor, matriculation in master's program requiring Psy 5200, or consent of instructor. (3F)

5330 (d6330). Psychometrics. Overview of measurement development principles and statistics. Evaluation, interpretation, and uses of standardized tests of aptitude, intelligence, achievement, personality, and adjustment. Prerequisites: Psy 1010, 2800. (3F)

5500. Interdisciplinary Workshop. (1-3F,Sp,Su) ®

5670. Psychological Principles and Individuals who are Deaf and Hard of Hearing. Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. (3Sp)

5720. Behavior Analysis Practicum. Students receive supervised training in applying behavior analysis principles in community, school, and institutional settings. Either SpEd 5050 or Psy/SpEd 5720 fulfill part of practicum requirement for Behavior Analysis track. Prerequisite: Permission of instructor. (3F)

5900. Independent Study. Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

5910. Independent Research. Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

5930. Instructional Apprenticeship in Psychology. Didactic and applied experience in course preparation and instructional techniques applicable to the teaching of psychology. Intended for students planning careers as instructors at the secondary and postsecondary levels. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

CI 5950. Undergraduate Apprenticeship I. Orientation to profession of psychology. Students clarify career goals, identify steps necessary to achieve goals, prepare a vita, plan and begin executing their apprenticeship experience with faculty member(s) or approved agency, and present progress reports to diverse audiences. (3F,Sp)

CI 5960. Undergraduate Apprenticeship II. Under supervision of departmentally approved agency and/or faculty member(s), students complete their pre-approved apprenticeship, which involves conducting research and/or providing community service. Students prepare a report of this experience and present it to diverse audiences. Prerequisite: Psy 5950. (3F,Sp)

6010. Introduction to Program Evaluation: Evaluation Models and Practical Guidelines. Alternative approaches and practical guidelines for conducting evaluation studies. Through case studies and simulations, addresses impact of social, political, and ethical issues on evaluation. (3F,Su)

6050 (d5050). Psychological Aspects of Sports Performance. Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. (3Sp)

6150. Behavioral Assessment and Treatment of Childhood Psychological Disorders. Introduction to single-subject treatment designs and basic principles of applied behavior analysis. Behaviorally-oriented treatment approaches for psychological disorders of childhood. Should be taken concurrently with a clinical practicum or assistantship. (3Sp)

6220. Group Counseling. Introduction to theory of group counseling with illustrative experiences to show how theory may be applied. Prerequisite: Psy 6350. (3Su)

6240. Introduction to School Counseling and Guidance. Introduction to role and function of school counselors. Overview of history of school guidance and counseling, and role of counselors in comprehensive guidance program. (3F)

6250. Internship in School Counseling and Guidance. Internship in approved school system involving comprehensive guidance activities, under supervision of certified school counselor. (1-10F,Sp,Su) ®

6260. Career Development: Theory and Practice. Consideration of career patterns and factors influencing career development and career effectiveness. (3Sp)

6290. Diversity Issues in Treatment and Assessment. Introduction to diversity issues in counseling and psychological/educational assessment, including culture, gender, language, and related issues. Training in models for providing effective psychological services to clients, taking into account their unique background. Prerequisite: Psy 6350 or instructor's consent. (3Sp)

6310. Intellectual Assessment. Training and supervised experience in administering and interpreting individual intellectual ability tests, such as the Wechlser and Stanford-Binet scales. Prerequisite: Matriculation into School Psychology program or Professional-Scientific Psychology program. (3F)

6320. Objective Assessment of Personality and Affect. Research bases and clinical applications of objective psychological assessment instruments and techniques, designed to measure adolescent and adult personality, affect, and psychotherapy. Prerequisite: Psy 6310. (3Sp)

6330 (d5330). Psychometrics. Overview of measurement development principles and statistics. Evaluation, interpretation, and uses of standardized tests of aptitude, intelligence, achievement, personality, and adjustment. Prerequisites: Psy 1010, 2800. (3F)

6340. Psychological and Educational Consultation. Overview of theory and practice of consultation as provided by counselors, psychologists, and other mental health education professionals. Consultation with teachers, parents, medical professionals, and organizations, emphasizing applications in educational settings. (3F)

6350. Introduction to Theory and Practicum in Counseling. Introduction to basic theories and techniques of counseling, with applied practice in role-playing, interviewing, and actual counseling sessions with practice subjects. Prerequisite: Matriculation in School Counseling, School Psychology, or Professional-Scientific Psychology program. (3F)

6360. Practicum in Counseling and Psychotherapy. Supervised practicum in counseling and psychotherapy conducted within Psychology Community Clinic. Closely supervised practice in assessment, counseling, psychotherapy, and consultation with individuals, couples, and families. Prerequisite: Psy 6350. (3Sp,Su) ®

6370. Practicum in School Counseling. Supervised practicum in public school setting, under direction of certified school counselor. Taken by students in School Counseling master's program. (3F,Sp,Su) ®

6380. Practicum in School Psychology. Supervised practicum in school psychology in public school or closely related setting. Taken by second-year students in School Psychology master's program. (3F,Sp,Su) ®

6410. Psychoeducational Assessment. Training and supervised experience in assessment of school-age and preschool-age children. Administration and interpretation of cognitive, developmental, and academic achievement measures, along with other psychoeducational assessment instruments and methods. (3Sp)

6450. Introduction to School Psychology. Introductory overview of field of school psychology. Role and function of school psychologist, historical context of school psychology, and trends and new developments in service provision. Prerequisite: Matriculation into School Psychology master's program or Professional-Scientific Psychology doctoral program. (1F)

6460. Professional Issues in School Counseling and School Psychology. Legal, ethical, and professional issues relevant to school counselors and school psychologists. Issues and practices in providing counseling and psychological services to "at-risk" students. Prerequisite: Graduate standing in psychology or instructor's consent. (3Su)

6470. Health Psychology. Explores psychological and behavioral principles relating to health and illness. Focuses on development and maintenance of health behaviors. Emphasizes integration of research findings with clinical intervention. Prerequisite: Graduate standing in Psychology; or graduate standing in Health, Physical Education and Recreation. (3Sp)

6500. Interdisciplinary Workshop. Series of self-instructional modules and videos and a variety of elective training. Module topics include developmental disabilities, legal aspects and issues, assessment, intervention, assistive technology, transition, and prevention/intervention for aggression and violence. (1-2F,Sp,Su) ®

6510. Social Psychology. Provides all graduate students with common knowledge base in social psychology. Emphasizes overview of recent developments, while also discussing social psychology principles as a guide in executing evaluation research and helping clients. Understanding of both emphases ensures breadth as psychologists. (3Sp)

6530. Developmental Psychology. Advanced survey course in general developmental psychology. Theory and research in human development across the lifespan, with particular emphasis on child and adolescent development. (3Sp)

6570. Introduction to Educational and Psychological Research. Provides introduction to research methods, including identification of research problem, review and evaluation of research literature, and design and implementation of research project. Prerequisite: Psy 2800. (3F,Sp,Su)

6600. Measurement, Design, and Analysis I. Integrates concepts in measurement, research design, and statistical anaylsis for research in psychology and education. Emphasizes experimental design, correlation, regression, and general linear model. Prerequisites: Psy 2800, Educ/Psy 6570. (3F,Sp,Su)

6610. Measurement, Design, and Analysis II. Builds on content of Educ/Psy 6600, and extends measurement, research design, and statistical analysis concepts to include within-subject and factorial designs, analysis of variance and covariance, and introduction to factor analysis and structural equation modeling. Prerequisite: Educ/Psy 6600. (3F,Sp,Su)

6650. Theories of Learning: The Behavioral Perspective. In-depth examination of the major behavioral theories of learning, including classical and operant conditioning. (3F)

6660. Cognition and Instruction. Survey of theory and principles in cognitive psychology, with special emphasis on applying these principles in instructional settings. (3Sp)

6810. Seminar. Special topics designed to help students develop in-depth knowledge of emerging research, theory, and practice in psychology. Taught in seminar format by USU faculty or visiting scholars. (1-3F,Sp,Su) ®

6820. Clinical Applications of Biofeedback. Training in clinical applications of biofeedback for treating common health, psychological, and stress related problems. Practical experience provided in use of different modalities of biofeedback (e.g., neurofeedback, skin temperature training, and electrodermal training). Stresses importance of integrating biofeedback into other appropriate treatments. Prerequisite: Graduate standing in psychology or instructor's consent. (3Sp)

6880. Transcultural Assessment Lab. Psychoeducational assessment laboratory experience to be taken by students in the School Psychology and Professional-Scientific Psychology programs in conjunction with Psy 6290. (1Sp)

6890. Assessment of Child and Adolescent Psychopathology and Personality. Theoretical foundations and applied training in methods of assessing and classifying behavioral, social, and emotional problems of children and adolescents. Prerequisite: Matriculation into Professional-Scientific Psychology doctoral program or School Psychology master's program. (3Sp)

6900. Independent Study. Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

6910. Independent Research. Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

6930. University Teaching Apprenticeship. Prepares graduate students for college teaching. Students learn to prepare study guides, examinations, and lectures, and learn to use audio-visual aids. Students also examine various current methods of instruction and course evaluation schemes. (1-3F,Sp,Su) ®

6950. Internship in School Psychology. Internship in approved school system involving assessment, counseling, consultation, and program development, under the supervision of a certified school psychologist. Prerequisite: Matriculation into School Psychology master's program or Professional-Scientific Psychology doctoral program. (3F,Sp,Su) ®

6970. Thesis. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

***7020. Advanced Evaluation Methodology and Techniques.** Provides advanced theory and practice in focus group interviews, on-site visit techniques, observation and anchor scales, multiple-site evaluation standards, and advanced reporting techniques. Prerequisite: Psy 6010. (3Sp)

7040. Practicum in Evaluation Planning and Contracting. Provides detailed information on methods for planning program evaluations, negotiating agreements with client/sponsor, and finalizing evaluation contract. Taught every third year. Prerequisite: Educ/Psy 6010. (3Sp)

7050. Internship in Program Evaluation. Experience in practical aspects of

program evaluation through planned, supervised evaluation project participation approved by student's supervisory committee. Prerequisite: Educ/Psy 6010. (1-9F,Sp,Su) ®

7060. Internship in Research. Research experience gained through conducting planned, supervised research project. Prerequisites: Approval by supervisory committee and Psy 6570. (1-9F,Sp,Su) ®

7070. Advanced Measurement Theories and Practice. Covers psychometric topics, including classical test theory, generalizability theory, item response theory, and issues concering bias in psychological testing. Prerequisites: Psy 5330/6330, Educ/Psy 6600. (3F)

7080. Multivariate Methods in Psychology and Education. Focuses on application of multivariate methods (factor analytic techniques, structural equation modeling, canonical correlation, multivariate analysis of variance, etc.) in research and measurement in psychology, education, and other social and behavioral sciences. Prerequisites: Psy 5330/6330, Educ/Psy 6600, 6610. (3F)

7090. Research and Evaluation Methodology Program Seminar. Provides opportunity for all doctoral students in the Research and Evaluation Methodology Program to meet on a regular basis to read journal articles, explore student and faculty research projects, and discuss current issues in the field. (1Sp) ®

7100. Biological Basis of Behavior. Explores normal and abnormal behavior from a basic neuroanatomical/neurophysiological perspective. Discusses pharmacological/ nonpharmacological applications. (3F)

7110. Advanced Theories in Cognitive Psychology. In-depth study of theories, models, and current research in the field of cognitive psychology, including memory, perception, problem-solving, and decision making. Prerequisite: Psy 4420 or 6660. (3F)

7230. Theory and Research in Personality. Overview of theoretical approaches, research, and clinical applications regarding personality differences. (3Sp)

7250. Professional Ethics and Standards. Designed to train clinicians and researchers in the field of psychology to operate within the professional ethics and standards of the field. (3F)

7270. Psychopathology. Summarizes research on risk, epidemiologic factors, and etiological perspectives regarding emotional and behavioral disorders of adolescents and adults. Models of classification of disorders are outlined, emphasizing the DSM system. Focuses on anxiety, mood, somatoform, dissociative, personality, and psychosexual disorders, as well as schizophrenia, drug/alcohol dependence, violence, and psychological factors affecting physical illness. (3F)

7320. Advanced Personality Assessment. Theory and clinical training in personality assessment, with additional techniques than those covered in Psy 6320. Examines Rorschach, Thematic Apperception Test, and additional techniques. Prerequisite: Psy 6320 or instructor's consent. (3F)

7350. Practicum in School Psychology. Doctoral-level practicum in a school setting. Supervised experience in developmental, learning, and school-related problems. Appropriate assessment and consultation with teachers, administrators, parents, and other related individuals. Prerequisite: Permission of program chair. (3F,Sp,Su) ®

7360. Practicum in Counseling Psychology. Doctoral-level practicum in a counseling setting. Supervised experience in individual, group, and family counseling. Appropriate assessment and consultation. Prerequisite: Permission of program chair. (3F,Sp,Su) ®

7370. Practicum in Clinical Psychology. Doctoral-level practicum in a clinical setting. Supervised experience in individual, group, and family psychotherapy. Includes psychological assessment and consultation. Prerequisite: Permission of program chair. (3F,Sp,Su) ®

7670. Proposal Development. Advanced concepts in designing, writing, and critiquing literature reviews including meta-analysis. Students work with instructor and their adviser to develop a dissertation proposal. Prerequisite: Educ/Psy 6610, Educ 6770. (3F,Sp,Su)

****7700. Grant Writing.** Students learn to identify funding sources, select strategies for seeking resources, and write proposals for research, development, training, and service activities in education, psychology, and related fields. Prerequisite: Psy/Educ 6570. (3Sp)

7810. Seminar. Special topics designed to help students develop in-depth knowledge of emerging research, theory, and practice in psychology. Taught in seminar format by USU faculty or visiting scholars. (1-3F,Sp,Su) ®

7900. Independent Study. Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

7910. Independent Research. Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (1-3F,Sp,Su) ®

7950. Internship in Professional Psychology. One-year, supervised, full-time internship required of doctoral candidates in professional psychology (clinical, counseling, and/or school psychology). Prerequisite: All doctoral coursework completed, with the possible exception of the dissertation if approved by the student's committee, prior to initiating the internship. (1F,Sp,Su) ®

7970. Dissertation. (1-18F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through Continuing Education Independent and Distance Education.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Rangeland Resources

College of Natural Resources

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Professors *James E. Bowns*, range ecology; *Martyn M. Caldwell*, plant physiological ecology; *Frederick D. Provenza*, range animal production; *Neil E. West*, desertification/condition/trend; *John P. Workman*, range economics; **Adjunct Professor** *Douglas A. Johnson*, plant ecophysiology; **Professor Emeritus** *Thadis W. Box*, range management; **Associate Professors** *Roger E. Banner*, range extension; *Christopher A. Call*, vegetation manipulation/management; *D. Layne Coppock*, animal production systems/technology transfer and international pastoral development; *James P. Dobrowolski*, range watershed management; *Brien E. (Ben) Norton*, grazing ecology/international range management; *G. Allen Rasmussen*, fire ecology and range succession; *Eugene W. Schupp*, plant population ecology; **Adjunct Associate Professors** *Mark W. Brunson*, rangeland sociology and policy; *Kenneth C. Olson*, grazing livestock nutrition; *James A. Pfister*, poisonous range plants; *Michael H. Ralphs*, poisonous plants/grazing management; *R. Douglas Ramsey*, landscape ecology; **Extension Associate Professor** *Charles W. Gay*, Assistant Dean for Administrative Affairs and Extension, international range management; **Adjunct Assistant Professors** *Dale L. Bartos*, range ecology; *Thomas A. Jones*, native grass breeding

Degrees offered: Bachelor of Science (BS), with opportunity for Honors degree, in Range Science; Master of Science (MS) and Doctor of Philosophy (PhD) in Range Science; MS and PhD in Range Ecology

Undergraduate Programs

Objectives

Courses and curricula in the department provide education and training that prepare students for a variety of careers related to rangeland resource management. These careers are usually with state agencies and the numerous federal land management and advisory agencies in the U.S. Departments of Agriculture and the Interior, but are increasingly with environmental consulting firms, real estate firms, banks and large ranches.

Admission Requirements

Admission requirements for the Department of Rangeland Resources are the same as those described for the College of Natural Resources on page 84.

Graduation Requirements

All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. The average for all courses taught by the College of Natural Resources must be 2.5 or higher.

Bachelor of Science in Range Science. Students completing this four-year program of 124 credits will qualify for a professional career in natural resource management. In addition to completing University Studies courses, students build a solid science and communications background by taking Biol 1210, 1220, 1230, 2400, 4400; Chem 1110, 1120; Math 1100; Stat 2000; Engl 1010, 2010; and Econ 2010. Students take required courses from the department (RLR 1990, 2910, 4000, 4450, 4910, 5410, 5610, 5630, 5700), as well as from other departments (ADVS 2080, 2090, 3500; FR 3500, 4250; FW 3200, 3210; Soil 3000, 5130; WS 3700). These courses assist students in understanding the various components that are important in land management and its dynamic nature. Finally, students are also required to take several college core courses (NR 1130, 2220, 2340, 3000, 3600, 4000), which are designed to further expand the understanding of natural resource systems and how they are managed.

Note: At the time this *General Catalog* went to press, changes to this degree program were underway. Therefore, it is important for students to consult the Rangeland Resources main office (NR 210) for updated information.

Minor in Range Science. Students desiring a minor in Range Science are required to complete the following courses: RLR 4450, 5410, 5610 and 5700; and NR 3000. Approval of the department head is also required.

Additional Information

For more information about the Bachelor of Science requirements, course sequencing, departmental special interest areas and their corresponding approved coursework, and updated information describing current programs and courses offered by the Department of Rangeland Resources, visit the Rangeland Resources main office, Natural Resources 210, or check the departmental web page at:
http://www.usu.edu/~cnr/range/rrhome.htm.

Financial Support

In addition to scholarships, assistantships, grants-in-aid, and work-study programs available through the University, the Rangeland Resources Department offers several scholarships to departmental undergraduate students. Information and application forms can be obtained from the CNR dean's office. Scholarship information is also available on the departmental web page.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. The program of instruction and research leading to graduate degrees in range science is available only to students meeting high scholastic standards who are accepted by the departmental faculty. Students desiring entrance to these graduate programs should contact the department head for information concerning eligibility.

A range science baccalaureate major is not required for admission; deficiencies in course background will be addressed by a student's supervisory committee.

Degree Requirements

The MS may be obtained with either a Plan A or Plan B program, as described on pages 64-65. The Plan B (nonthesis) option is recommended for professional range managers who do not desire research training. Comprehensive exams (both oral and written) are required in the doctoral program. A graduate student handbook outlining the Rangeland Resources graduate program policies and procedures is available from the department.

The department offers two graduate degrees at both the MS and PhD levels: **Range Science** and **Range Ecology**. The latter is part of the USU Ecology Center Graduate Program and requirements are coordinated with the center.

Master of Natural Resources. The department also participates in the College of Natural Resources Master of Natural Resources (MNR) degree program. For more information, see page 309.

Research

Cooperation with other departments and research centers of the University and with government collaborators permits strong graduate programs in all phases of range-related sciences. Particular mention should be made of the University's Ecology Center, in which the Rangeland Resources Department is very active; the Utah Agricultural Experiment Station, which has a full program in both applied and basic range research; the Center for Water Resources Research, which sponsors range watershed research; the Utah State Wildlife Resource program, which cooperates in big game-range research; the U.S. Forest Service Rocky Mountain Forest and Range Experiment Station, which maintains a research center on the campus for range and watershed research; and the Agricultural Research Service, which works in range plant improvement, genetics, and poisonous plants. The Institute for Land Rehabilitation, located within the department, acts as an information clearinghouse and offers directed studies in land reclamation, especially of semiarid rangelands. The International Pastoral Production Institute, also located within the department, offers training in production systems for developing nations.

Financial Assistance

Graduate research assistantships in the department are offered to both MS and PhD students, contingent upon fund availability from faculty project grants. In addition to the annual stipend amounts, funding for health and accident insurance is provided. Additional coverage may be purchased by the student, if desired.

The nonresident portion of tuition is waived for holders of a Graduate Research Assistantship (GRA) for the first year of the program. In-state resident tuition is required of all students.

Domestic PhD students on a GRA are required to hold at least one Graduate Teaching Assistantship (GTA) during their program, whereby they obtain experience in classroom (mainly undergraduate) instruction. MS students may also hold GTA's, provisional upon availability of funds.

Additional Information

For more information about graduate programs, departmental faculty and their research emphasis areas, and updated information describing current programs and courses offered by the Department of Rangeland Resources, visit the Rangeland Resources main office, Natural Resources 210, or check the departmental web page at:
http://www.usu.edu/~cnr/range/rrhome.htm.

Rangeland Resources Courses (RLR)

1990. Rangeland Resources Orientation Seminar. Introduction and orientation to the rangeland resource discipline and profession, and the Rangeland Resources Department. Education, curricula, faculty, professional societies, and employment opportunities. (1F)

BLS 2200. Ecology of Our Changing World. Foundations of ecological and evolutionary relationships of organisms with other organisms and with the physical environment, emphasizing populations, communities, and ecosystems. Integration of basic science with applications of science to understanding human interactions with the environment. (3F,Sp)

2910. Professional Leadership Seminar. Development of professional leadership and communication skills, including mission statements, time management, and team building. (1Sp)

DSC 3050. Ecology of Logan Canyon and Vicinity. Examines natural and human-caused changes in biological and physical features in the local landscape through time. Emphasizes how ecological knowledge and a sense of place can help people to better understand local environmental issues. (3F)

3700. Fundamentals of Watershed Science. Study of water movement, hillslope processes, and nutrient movement in catchments, and its relevance to the properties, land use, and management of watersheds as natural resource units. Prerequisite: Soil 3000 or permission of instructor. (3Sp)

4000. Fundamentals of Grazing Land Management. Explores ecological basis for sustainable land use under grazing by domestic and native herbivores. Explains how to translate knowledge of grazing impacts into rangeland management guidelines. (3Sp)

4120. Directed Research in Rangeland Ecology. Introduction to research in rangeland ecology; taught in apprenticeship fashion. Prerequisite: Previous completion of 110 semester credits. (4F,Sp,Su)

4250. Advanced Internship/Co-op. Internship/cooperative education work experience; increased complexity to help student gain a more professional level of experience. (1-3F,Sp) ®

4450. Rangeland Plants. Identification, ecology, and uses of plants on rangelands of western North America. Prerequisite: Biol 2400. (3F)

4490 (d5490). Small Watershed Hydrology. Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research

findings for examining key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Prerequisites: Math 1210, WS 3700. (4F)

4800. Undergraduate Research. Individual or team directed research in subject of interest to the student. Prerequisite: Permission of instructor. (1-3F,Sp) ®

4900. Readings and Conference. Individually directed study in subject of interest to the student. Prerequisite: Permission of instructor. (1-3F,Sp) ®

4910. Range Issues Seminar. Supervised discussion and analysis of contemporary range resource issues with practicing professionals. Prerequisite: Range Science graduating senior. (1Sp)

4920. Honors Readings. Assigned readings in philosophy of range science and management strategies. Discussion sessions by arrangement with supervising faculty. Prerequisite: Enrollment in the Rangeland Resources honors program. (1-2F,Sp) ®

4950. Rangeland Problems. Individual study and research upon selected problems in range science and related subjects. Prerequisite: Faculty approval. (1-2F,Sp) ®

5070. Range Wildlife Relations. Explores interactions on rangelands between wild and domestic ungulates, as well as other wildlife forms around the world, but with emphasis on western North America. Prerequisite: NR 3000. (3F)

5100. Conflict Management in Natural Resources. Introduction to conflict management techniques for those involved in natural resource management. (2Sp)

***5290. Pastoral Production Systems.** Interdisciplinary approaches to understanding the dynamics of pastoral systems in economically developed and less-developed settings. Influences of culture, economics, and environment on resource management. Change and sustainability in pastoral systems. Innovations to enhance productivity or better mitigate risk. (3Sp)

QI 5410. Vegetation Analysis for Livestock and Wildlife. Methods and analytical procedures for measuring and assessing vegetation used by livestock and wildlife as forage and cover. Prerequisite: Stat 2000 or equivalent. (4F)

5490 (d4490). Small Watershed Hydrology. Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research findings for examining key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Prerequisites: Math 1210, WS 3700. (4F)

5610. Wildland Ecosystems. Structure, function, dynamics, classification, and multiple-resource management of terrestrial ecosystems found in the Intermountain West. Prerequisites: NR/Biol/FW 2220, Soil 3000, Biol 2400. (3Sp)

5630. Range Vegetation Manipulation and Management. Changing composition, structure, and productivity of range vegetation for multiple-use purposes by use of biological, chemical, mechanical, and pyric methods. Prerequisites: NR/Biol/FW 2220, NR 3000. (3F)

****5660. Restoration of Wildland Watersheds.** Features problem analysis, objective setting, and application of methods and monitoring. Provides detailed exploration of implications of restoration treatments to: the partitioning and timing of water through the hydrologic cycle, stream channel and hillslope stability relationships, sediment and nutrient fluxes, biodiversity and productivity, and land management. Prerequisites: WS 4490, 5150, 6800; RLR 5610 (or equivalent). Registration by Watershed Science majors requires permission of the Watershed Unit director. (3Sp)

****5670. Restoration of Wildland Watersheds Practicum.** Practical field-oriented course to accompany WS 5660. (1Sp)

5700. Rangeland Economics and Management. Senior capstone course preparing students to conduct economic evaluations and prepare inventories and management plans for private ranching operations and large tracts of public rangeland. Prerequisites include most required courses in Rangeland Resources. (5F)

****5860. Poisonous Range Plants Affecting Livestock.** Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. (2Sp)

****6000. Grazing Systems.** Overview and analysis of various strategies for managing grazing on rangelands. Special attention given to ecological mechanisms by which a particular grazing system may benefit livestock production or the sustainability of rangeland resources. (2Sp)

6050. Rangeland Fire Ecology and Fire Prescription Development. Provides understanding of the role prescribed and natural fires have in western U.S. rangeland plant communities, and when fire can be used to achieve a specific plant community. Students learn basics of fire behavior and ignition techniques, and how to write prescribed fire use plans. (3Su)

6420. Vegetation Sampling Design. Advanced intrastand vegetation sampling design and elementary (nonmultivariate) between stand comparisons, primarily for research purposes. Prerequisites: Stat 5200; FR/RLR 6750 (or concurrent enrollment). (4Sp)

6520. Applied Hydraulics. Basic fluid mechanics applied to wildland watershed systems and directed at nonengineering students. Explores nature of fluid state, fluid motion, and steady uniform and varied flow in open channels, under both subcritical and supercritical conditions. Surveys concepts of boundary layers, turbulence, convection, dispersal, and wave formation in unsteady flows. Emphasizes problem formulation and solving. Prerequisites: WS 4490; Math 2280 (recommended). (3F)

6750. Plant Community Ecology. Theory and concepts of plant community ecology. Plant community composition, distribution in space, and dynamics in time. Species environmental response models, competition theory, statistical predictive models, and concepts of multivariate analysis in plant ecology. Prerequisites: NR/Biol/FW 2220 or equivalent; and ecology core courses (may be taken concurrently). (3F)

6800. Seminar. Review of current research by graduate students and faculty. (1F,Sp) ®

6870. Ecology Seminar. The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. (1F) ®

6900. Readings and Conference. (1-3F,Sp,Su) ®

6910. Special Topics in Range Science. Provides graduate students with opportunity to discuss a range science topic not covered in other classes or to review recent literature. (1-3F,Sp,Su) ®

6920. Special Topics in Ecology. Provides graduate students with opportunity to discuss an ecology topic not covered intensively in other classes or to review recent literature. (1-3F,Sp,Su) ®

6930. Special Topics in Physiological Ecology. Provides graduate students with opportunity to discuss a physiological ecology topic not covered intensively in other classes or to review recent literature. (1-3F,Sp,Su) ®

6940. Special Topics in Range Wildlife Relations. Provides graduate students with opportunity to discuss a range wildlife relations topic not covered intensively in other classes or to review recent literature. (1-3F,Sp,Su) ®

6960. Graduate General Ecology. General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology

in both terrestrial and aquatic enviroments. (5F)

6970. Thesis Research. Original research for MS degree on a problem in rangeland resources. (1-12F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7000. Theory and Applications of Rangeland Ecosystem Management. Application of range management principles, new theory, and public policy to on-the-ground decision-making in public and private lands. Field trips required. (3F)

****7030. Plant-Herbivore Interactions.** Emphasizes principles of self-organization as applied to plant (tolerance and avoidance of herbivory) and herbivore (food and habitat selection) behavior. Stresses importance of history and ongoing interactions with the environment in understanding the dyanmics of plant-herbivore interactions. (3Sp,Su)

***7150. Plant Physiological Ecology.** Plant response to environmental factors; includes environmental biophysics, physical and physiological factors influencing productivity, water use, resistance to stress, reproduction, establishment of plants, and competition with neighboring plants. (3Sp)

7300. Plant Population Ecology. Dynamics of plant populations as influenced by interactions with their abiotic and, especially, biotic environments. Topics include dormancy and germination strategies, intra- and interspecific competition, facilitation, disturbance, herbivory, pathogenic and mutualistic fungi, pollination, seed dispersal, and vegetative reproduction. (3F)

7310. Developing Careers in Research. Seeking research positions, research funding, the grant proposal and publication process, research directions and career paths, budgeting, the tenure process, and research outside of universities. (1F)

****7420. Analysis of Vegetation Patterns.** Advanced treatment of vegetation sampling, classification, and ordination between stands over landscapes, designed primarily for researchers. Prerequisites: EC (core), RLR 6420, FR/RLR 6750, Stat 5200, and familiarity with computers. (5Sp)

****7650. Rangeland Economic Analysis.** Survey of state-of-the-art methods in production function and benefit-cost analysis, including data examples from rangeland resources and agricultural eonomics literature. (2Sp)

7970. Dissertation Research. Original research and study for PhD degree on a problem in range science. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of

Secondary Education

College of Education

Head: Professor *William J. Strong*, English education, Director of Utah Writing Project
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Professors *James S. Cangelosi*, mathematics education, measurement/evaluation, instructional supervision; *Michael W. Heikkinen*, science education, measurement/evaluation, research methods; *Richard S. Knight*, social studies education, curriculum foundations, teaching/learning theory; *Walter L. Saunders*, science education, research methods; *James P. Shaver*, social studies education, research methods; **Professors Emeriti** *Ross R. Allen*, mathematics education, comparative education; *Eldon M. Drake*, journalism, general student teaching; *Kenneth C. Farrer*, curriculum development; *Izar A. Martinez*, administration, research methods, measurement/evaluation; **Associate Professor** *Kay Beth Camperell*, content area reading/writing, learning theory; **Associate Professor Emeritus** *Varnell A. Bench*, extension, administration, supervision; **Assistant Professor** *Grace C. Huerta*, educational foundations, multi-cultural education; **Senior Lecturer** *Ronald K. Drickey*, teaching methods, multi-cultural education; **Lecturer** *Patricia T. Stoddart*, English education and Director, Office of Field Experiences; **Undergraduate Adviser** *Harold E. Heap*, classroom management, adolescent development

Degrees Offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Secondary Education. The department participates in the Interdepartmental Doctor of Education (EdD) and Doctor of Philosophy (PhD) programs, focusing on the Curriculum and Instruction specialization.

Undergraduate Programs

Objectives

The Department of Secondary Education serves as the coordinating department for state-approved programs of secondary teacher certification across campus. Secondary Education provides the Professional Education Framework, a sequence of courses and field experiences designed to prepare students for teaching careers in secondary schools.

Because secondary teacher preparation is a shared responsibility at USU, the undergraduate adviser in Secondary Education works closely with advisers in 26 other departments. Those students recommended for certification are regarded by Secondary Education faculty as "community-builders"—empowered individuals whose collaborative efforts can improve middle schools and high schools in far-reaching ways.

The program of secondary teacher preparation is fully accredited by the Utah State Board of Education and by the National Council for Accreditation of Teacher Education. Students who successfully complete the program are recommended for secondary certification in the State of Utah, enabling them to teach in grades 6-12.

Requirements

Departmental Entrance Requirements. In addition to meeting the admission requirements for the University, students in good standing must have a minimum entrance GPA of 2.75 and maintain that GPA in order to student teach. All students must be admitted to the teacher education program. See details below.

Admission to Teacher Education. Prior to enrolling in professional education courses, students must be admitted to the teacher education program. Criteria for *provisional admission* include ACT scores, University Studies requirements, an essay describing "Why I Want to be a Teacher," a speech and hearing test, a computer skills competency test (or coursework equivalent), successful completion of the Teacher Education Writing Exam, a Teacher Education Interview, and recommendations from advisers in major and minor fields. Provisional admission requirements may be completed *before* students complete 60 semester credits. Application forms are available from advisers and from the Teacher Certification Office, Emma Eccles Jones Education 103.

Full admission is achieved following the completion of 60 semester credits. Students must submit copies of University transcripts, including transfer coursework, verifying a minimum GPA of 2.75. Criminal Background Check materials, required by the State of Utah, must also be submitted at this time. The cost of the Criminal Background check is $10, payable to the Utah State Office of Education. A money order must be provided as payment. Questions about the admission requirements should be directed to the Secondary Education adviser.

Bachelor of Science in Secondary Education. For the bachelor's degree, students must complete: (1) 30 credits of University Studies requirements, including written communications; (2) an approved composite major *or* an approved teaching major and approved teaching minor (*see list below*); (3) the Professional Education Framework (35 credits minimum); and (4) electives. Upon completing all requirements for graduation, students are eligible to apply for a secondary teaching certificate from the Utah State Office of Education (grades 6-12). Students with the Social Studies Composite Major graduate from the Department of Secondary Education.

Several departments offering composite majors or teaching majors require that students graduate from their departments. These majors are Agricultural Education, Art Education, Business Education, Marketing Education, Family and Consumer Sciences Education, Industrial and Technical Education, Health Education, Music Education, and Physical Education. Students majoring in other departments may graduate from either the department offering the major or from the Department of Secondary Education. Identical requirements must be met in either case.

Basic Secondary Teaching Certificate (grades 6-12). Students pursuing an academic major in other University departments, as well as those who have already received an undergraduate degree and wish to earn secondary teacher certification, must meet requirements 2 and 3 above. The adviser in Secondary Education assists returning students with program planning. Such students occupy "Second BS" status while pursuing certification. All students should note that *secondary teacher certification is not automatic upon completion of the program. In order to receive Utah certification, students must apply for the Basic Teaching Certificate in the Teacher Certification Office, Emma Eccles Jones Education 103, during the last semester of the senior year or upon completion of the program*.

Elementary Education Dual Certification. Beyond the basic requirements for the elementary education certificate, students must: (1) complete the requirements for a composite teaching major or for a teaching major/minor as indicated above, and (2) complete the professional education framework in secondary education, including special methods courses and student teaching at the secondary level.

Special Education Dual Certification. Students can be certified in both special education and in a secondary subject area through a dual certification program offered jointly by two departments. Early in their programs, students should consult with undergraduate advisers in Secondary Education and the Department of Special Education and Rehabilitation.

Optional Middle Level Endorsement (grades 6-9). Students interested in improving their employment prospects in the middle grades may pursue the Middle Level Endorsement. This program of specialized coursework, *added to* the Secondary Teaching Certificate, focuses specifically on the middle grades. To be recommended for the Middle Level Endorsement, students must student teach in the middle grades (ScEd 5600); and complete an additional 8 credits from ElEd/ScEd 4600, ElEd/ScEd 4610, and one course chosen from a menu of middle-level options (see Secondary Education adviser).

Composite Majors, Teaching Majors, and Teaching Minors. As suggested above, secondary certification requires that students select a composite teaching major *or* a teaching major plus a teaching minor. Students are encouraged to begin with the *Guide to the Undergraduate Program in Secondary Education at USU*. The following composites, majors, and minors are approved by the Utah State Board of Education. Specific course requirements are available from department advisers across campus.

Composite Teaching Majors (46 credits minimum). Agricultural Education, Art Education, Biological Science, Business Education, Earth Science, Family and Consumer Sciences Education, Industrial Teacher Education, Marketing Education, Music Education, and Social Studies Education.

Teaching Majors (30 credits minimum). Chemistry, Economics, English, Geography, Health Education, History, Mathematics, Modern Languages, Physical Education (K-12), Physics, Political Science, Psychology, Sociology, and Theatre Arts.

Teaching Minors (16 credits minimum). Business Computer and Information Systems, Business Education, Chemistry, Economics, English, Geography, Health Education, History, Marketing Education, Mathematics, Modern Languages, Physical Education—Coaching, Physics, Political Science, Psychology, Sociology, Speech, and Theatre Arts.

Professional Education Framework

Three-Level Program (35 credits). Secondary Education coordinates a state-approved program to complement the teaching majors and minors in 26 departments. The framework is organized into three sequential levels, each taken during a different semester. Students should plan to take the framework during their junior and senior years while completing major and minor coursework. *All three levels of the framework are offered during fall and spring semesters, but not during summers. Levels of the framework are taken as a package, not piecemeal. Each level must be satisfactorily completed before students advance to the next level.*

As outlined below, Level 1 and Level 2 courses are offered by the departments of Instructional Technology, Special Education and Rehabilitation, and Secondary Education. Special methods classes are offered by many campus departments. Following requirement sheets for teaching majors and minors, students should take methods courses at Level 1 and Level 2 to prepare for student teaching at Level 3. A master schedule of methods courses is available from departmental advisers or from the Department of Secondary Education. Student teaching in *both* the major and minor fields is required at USU.

Level 1 (10 credits). After admission to teacher education, students should take the following Level 1 courses during the same semester: InsT 3000; ScEd 3100, 3200. In addition, Level 1 students must take a special methods course in either their major or minor teaching field. Finally, a departmentally sponsored course with a 3300 number should be taken for in-school clinical experiences.

Level 2 (10 credits). After successfully completing Level 1 courses, students should take the following Level 2 courses during the same semester: SpEd 4000; ScEd 4100, 4200. In addition, Level 2 students must take a special methods course in either their major or minor teaching field. Finally, a departmentally sponsored course with a 4300 number should be taken for in-school clinical experiences.

Level 3 (15 credits). After successfully completing Level 2 courses, students should take the following Level 3 courses during the same semester: ScEd 5100, 5200, 5300. These courses are offered in a 5-week block immediately preceding student teaching. In addition, students should enroll for a student teaching seminar (departmentally sponsored 5500), as well as for secondary student teaching (departmentally sponsored 5600). These courses are offered in a 10-week block. See *Background Check and Student Teaching* section below.

Clinical (Field) Experiences. Concurrent with special methods courses, students must enroll for either Clinical Experience 1 or Clinical Experience 2. Special methods instructors set up and monitor these field activities in middle school and high school settings. These experiences provide students with real-world contexts for their on-campus learning. Although Clinical Experiences may take different forms depending on the subject area, students should plan for at least 40 hours of in-school time at each of the three levels. The Clinical Experience at Level 3 (5 weeks immediately preceding a 10-week block of full-time student teaching) is coordinated by Secondary Education. Prior to student teaching, all students should accumulate a minimum of 120 hours of work with middle school and high school students.

A Clinical Experience fee of $50 is assessed at each of the three levels. This fee provides a modest stipend to mentor teachers who provide USU students with feedback for their professional development. Because most students will be placed both in a middle school and a high school setting at Level 1 and Level 2, most mentor teachers will receive a $25 stipend for their 20 hours of supervision. It is vitally important for USU students to acknowledge the important contributions made by their mentor teachers.

Conceptual Framework and Professional Portfolios. As noted earlier, the program of secondary teacher preparation is organized around the theme of "teaching for community." Students learn how exemplary secondary teachers build and maintain (1) classroom community; (2) local community; (3) professional community; (4) intellectual community; and (5) ethical community. Within this conceptual framework, 10 core concepts create the basic structure for coursework and field experiences.

A vital element of the Conceptual Framework is the development of a Professional Portfolio. At all three levels of the program, the portfolio is used to reflect upon the community-building theme and to construct knowledge related to the 10 core concepts being studied. Prior to student teaching, students schedule an individual interview with the director of field experiences and share significant portions of their portfolios. The Portfolio Interview helps to confirm the student's readiness for student teaching placement. During student teaching, students continue to develop and refine their portfolios. In the student teaching seminar (a capstone experience) the Professional Portfolio is organized to reflect the needs of employment interviews.

Background Check and Student Teaching. As a result of legislative mandate, all applicants for student teaching must undergo a criminal background check prior to student teaching placement. The Office of Field Experiences, Emma Eccles Jones 330, will assist students in complying with this mandate. The fee for the background check, payable *only* by money order to the Utah State Office of Education, is $10.

Applications for student teaching must be submitted to the Field Experiences Office, Emma Eccles Jones Education 330, by April 15 for fall semester and by October 15 for spring semester. *Students must have completed 80 percent of their teaching major/minor (or composite major) requirements prior to student teaching*. A Portfolio Interview is part of the application process.

Students should be financially prepared to stay off campus, if necessary, during the 10-week block of student teaching. Because student teaching requires a major commitment of time and energy, it should be planned with care. Students are urged to forego outside employment, if possible, during the student teaching experience.

Graduate Programs

Admission Requirements

The Department of Secondary Education assists in the preparation of graduate students seeking the MEd, MA, and MS degrees, as well as the EdD and PhD degrees. Students desiring information concerning the various graduate programs should contact the department head. The application for admission to a graduate program is made through the School of Graduate Studies. See *Graduate Admission Procedures* (pages 60-61).

Students applying to a master's degree program may take either the Miller Analogy Test (MAT) or the Graduate Record Exam (GRE). Students applying to a doctoral degree program should take the GRE. Scores at the 40th percentile or above are required for admission. In addition, students must have at least one year of teaching experience (or comparable professional experience) and a valid secondary teaching certificate.

All students applying to the doctoral degree program (Curriculum and Instruction specialization) participate in oral interviews with the Curriculum and Instruction Management Committee. A sample of academic writing should be included as part of the doctoral-level admission folder.

Master's applications are considered three times a year: June 15 for fall semester registration, October 15 for spring semester registration, and March 15 for summer semester registration. Doctoral applications are considered more frequently. *Application folders will be not be considered until all required information is received by the School of Graduate Studies and sent to the department*.

Master's Degree Programs

Secondary Education master's degree programs provide coursework and professional experiences for those preparing to become master teachers, teacher-leaders, supervisors, or curriculum specialists. Each program provides coursework in education, with associated work in a specialized subject matter, which is the teacher's area of concentration. Typically, the area of concentration derives from the teacher's ongoing work with middle school or high school students.

Areas of emphasis in Secondary Education include the following: **General** (particularly for those who intend to pursue the Administrative Supervisory Endorsement following completion of the master's degree); **Gifted and Talented**; **English**; **Mathematics**; **Middle School**; **Reading**; **Science**; and **Social Studies**. Three University departments—Art, Business Information Systems and Education, and Music—also participate in master's degree programs sponsored by Secondary Education. Admission to these fields of study requires approval of the cooperating department. In planning areas of emphasis, students work with a faculty adviser and select graduate courses from the University-wide curriculum.

MEd Degree (36 credits). Because of its flexibility and practicality, the MEd in Secondary Education is the program of choice for many experienced teachers. Students take a common core of courses from college and departmental curricula, then plan areas of concentration in relation to their teaching specialities. The research course for the MEd focuses on issues of application as well as active research. Students prepare creative projects of diverse kinds linked to teaching realities. These projects address teacher-defined needs in unique and imaginative ways.

MS and MA Degrees (30 credits). For teachers whose long-term goals require a more traditional, research-oriented degree, Secondary Education offers MS and MA programs. (The MA degree requires foreign language competency.) Although coursework is similar to the MEd degree, students must have (or acquire) additional background in introductory statistics as preparation for a course in educational research. Research problems usually derive from a careful literature review. Subsequently, students develop research proposals which are taken through the College of Education review process. Only after a process of review do students embark on thesis research. Eventually, each thesis is reviewed by the dean of the School of Graduate Studies.

Doctoral Degree Programs

For students who have already completed a master's degree, Secondary Education participates in the interdepartmental doctoral program coordinated by the dean of the College of Education. Both PhD and EdD degrees are offered in the Curriculum and Instruction specialization. For an overview of the program, including program requirements and admission procedures, see pages 177-178 of this catalog. As with any degree program, students interested in doctoral study are encouraged to contact the department head of Secondary Education.

Financial Assistance

Both departmental support and grant support are occasionally available to doctoral-level students pursuing full-time study on campus. Such financial support typically is through assistantships, which carry half-time teaching, research, or supervisory obligations. Typical assistantships carry forward for three or four years. Awards are made on a competitive basis. Doctoral students who wish to be considered for financial aid should apply to the department no later than February 1 for the following academic year. Acceptance to graduate study does not guarantee financial assistance.

Secondary Education Courses (ScEd)

1000. Volunteer Experience. Optional course providing orientation to agencies coordinating volunteer experiences in the community; such experiences are part of standards for admission to secondary teacher education. (1F,Sp,Su)

3100. Motivation and Classroom Management. Exploration of adolescent motivation and development, as well as research-based techniques for classroom management in middle and secondary schools. Prerequisite: Program admission. (2F,Sp)

CI 3200. Teaching and Learning Strategies. Applications of basic communication principles and research-based techniques for effective, dynamic instruction in middle and secondary schools. (2F,Sp)

3300. Clinical Experience I. First clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level 1. Prerequisite: Program admission. (1F,Sp)

3400. Teaching Science I. Laboratory practicum focused on design, practice, and performance of secondary science demonstrations and investigative lab activities. Must be taken at Level 1. Prerequisite: Program admission. (3F,Sp)

3500. Teaching Social Studies. Methods course focused on social studies curriculum and instruction for preservice secondary teachers with teaching majors or minors in history or any of the social sciences. Should be taken at Level 1. Prerequisite: Program admission. (3F,Sp)

3600. Teaching English. Methods course focused on English curriculum and instruction for preservice secondary teachers with teaching majors or minors in English. May be taken at either Level 1 or Level 2. Prerequisite: Program admission. (3F,Sp)

4100. Cognition and Constructivism. Explores teaching/learning theory to support improved memory, skill acquisition, and knowledge construction in middle and secondary schools. Prerequisites: Program admission and completion of Level 1. (1F,Sp)

CI 4200. Reading, Writing, and Technology. Performance-based class focused on a wide range of academic skills related to reading, writing, and advanced technology access. Prerequisite: Program admission and completion of Level 1. (3F,Sp)

4300. Clinical Experience II. Second clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level 2. Prerequisite: Program admission and completion of Level 1. (1F,Sp)

4400. Teaching Science II. Methods course focused on science curriculum and instruction for preservice secondary teachers with teaching majors in any of the science areas. Must be taken at Level 2. Prerequisite: Program admission, completion of Level 1, and ScEd 3400. (3F,Sp)

***4600 (d6600).[1] Philosophy and Organization of the Middle Level School.** Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. (3F,Su)

****4610 (d6610). Curriculum, Methods, and Assessment for the Middle Grades.** Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. (3Sp,Su)

4620 (d6620). Service Learning Applications for the Middle Grades. Examines literature related to service learning for the middle grades. Application of service learning in curriculum. (3Su)

4900H. Senior Thesis. Student-initiated research project under faculty supervision. Requires prior approval of department head, honors committee, and instructor. Prerequisite: Approval of department head. (1-6F,Sp)

5000 (d6000). Practicum in Improvement of Instruction. Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. (1-6F,Sp,Su) ®

DSS, CI 5100. Educational and Multicultural Foundations. Explores historical, cultural, and legal/ethical aspects of schooling, with attention to diversity and bilingual inclusion. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. Offered only in 5-week block preceding student teaching. (2F,Sp)

5200. Assessing Student Achievement. Performance-based class focused on techniques for developing useful assessments, interpreting test results, and reporting evaluations of learning. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. Offered only in 5-week block preceding student teaching. (2F,Sp)

5300. Clinical Experience III. Third clinical practicum in middle and secondary schools. Arranged by Office of Field Experiences for 5 weeks before student teaching (40 hours minimum). Required of all students at Level 3. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (1F,Sp)

5400. Laboratory Practicum. Laboratory practicum for inservice teachers, focused on design, practice, and performance of secondary science demonstrations and investigative lab activities. (3F,Sp)

5500. Student Teaching Seminar. Ten-week capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, emphasizing reflective teaching. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (2F,Sp)

5600. Student Teaching in Secondary Schools. Ten-week culminating practicum in which students assume full-time teaching responsibilities under direction of cooperating teachers in major and minor fields. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (8F,Sp)

5700. Modified Student Teaching. Culminating practicum experience for students seeking dual certification, earning half of their student teaching credit in a secondary school setting. Prerequisite: Program admission and completion of Level 1 and Level 2. Offered during 10 weeks following ScEd 5100 and 5200. (2-4F,Sp)

5800. Secondary School Internship. Advanced practical teaching experience under combined public school and University supervision. Offered only by arrangement with Director of Field Experiences. Prerequisites: Level 1 and Level 2 completion, and special recommendation. (2-6F,Sp)

5900. Independent Study. Prerequisite: Instructor approval. (1-3F,Sp) ®

6000 (d5000). Practicum in Improvement of Instruction. Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. (1-6F,Sp,Su) ®

6040. Measurement and Evaluation in Education. Principles and techniques for developing, validating, and interpreting tests of student achievement and learning goals. (2F,Su)

6100. Motivation and Management in Inclusive Settings. Examines motivation and management principles, emphasizing at-risk and special needs children. Designed for regular education teachers, K-12. (2Su)

6150. Foundations of Curriculum. Examination of theories, principles, and foundations of curriculum, emphasizing program planning and current curriculum trends. (3F,Su)

6190. Theories of Teaching and Learning. Demonstration, analysis, and evaluation of various models of teaching, emphasizing research-based principles of learning. (3Sp,Su)

6250. Mathematics Curriculum and Instruction. Examination of current curriculum standards, trends, and effective methods of instruction for mathematics in middle and secondary schools. (2Su)

6300. English Curriculum and Instruction. Examination of current curriculum standards, trends, and effective methods of instruction for English/language arts in middle and secondary schools. (2Su)

6310. Content Area Reading and Writing. Practical approaches for teaching reading/writing and learning skills to elementary, middle, and high school students, emphasizing ESL and cross-discipline teaching in all content areas. (2Su)

6320. Processes of Cognition and Reading. Examination of sociocultural theory and cognitive research related to the comprehension and production of written language. Exploration of implications for improved language acquisition and literacy instruction. (2Su)

6330. Utah Writing Project. Workshop, seminar, and institute experiences in the Utah Writing Project, focusing on writing process, principles, and research-based strategies for improving writing instruction in grades K-12. (1-6Su)

6340. Issues and Trends in Literacy. Exploration of current issues and instructional trends in the teaching of reading and writing. Emphasis on reading widely and critically in the professional literature. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary or middle school. (2) ®

6350. Reading Assessment and Diagnosis. Covers the correlates and diagnosis of reading problems, as well as methods and materials for remedial reading instruction. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary, middle, or secondary school. (3Sp)

6360. Reading Improvement and Remediation. Designed to help classroom teachers update and enhance components of their reading instruction and assessment. Emphasizes development of balanced and comprehensive reading instruction program. Prerequisites: ElEd 3100, 4040; or teaching experience in elementary or middle school. (3Su)

6370. Supervised Internship in Reading and Writing. Individual practicum experience designed to allow graduate students to implement and focus on one or more aspects of reading and writing instruction in a classroom or clinical setting. Prerequisite: Consent of instructor. (1-3F,Sp,Su)

6400. Multiple Talent Approach to Teaching. Explores one model for embedding the teaching of creative and critical thinking in regular curricula. Includes practical application requirements. (2Su)

6420. Education of Gifted and Talented Learners. Provides multiple cultural and historical perspectives on giftedness and talent. Explores characteristics of gifted individuals, with emphasis on identifying needs. Provides general overview of possible services for gifted learners. Must be taken concurrently with ElEd/ScEd 6430. (2F)

6430. Practicum: Individual Case Study. Practicum experience in association with ElEd/ScEd 6420. Requires intensive supervised study of gifts and talents of individual child of student's choice. Must be taken concurrently with ElEd/ScEd 6420. (1F)

6440. Creativity in Education. Exploration of theories, research, and strategies concerning creativity, and their application to personal creativity and to improvement of classroom practice. (2Su)

6460. Identification and Evaluation in Gifted Education. Provides educators with theory and models for identifying students as gifted, creative, and talented. Presents models for evaluation of programs for gifted learners. Explores instruments for use in identification and evaluation. Must be taken concurrently with ElEd/ScEd 6470. (2Sp)

6470. Practicum: Team Consultation. Practicum experience in association with ElEd/ScEd 6460. Requires participation, as part of a consultative team, to improve practice in an approved setting for a specific child, classroom, school, school district, or other educational entity. Must be taken concurrently with ElEd/ScEd 6460. (1Sp)

6480. Methods and Materials in Gifted Education. Explores programming and curriculum models in gifted education, with special attention to the development of instructional materials for use with students. Must be taken concurrently with ElEd/ScEd 6490. (2F)

6490. Practicum: Classroom Applications. Practicum experience in association with ElEd/ScEd 6480. Requires application of at least three curriculum, cognitive, or affective models in the student's current teaching assignment. Must be taken concurrently with ElEd/ScEd 6480. (1F)

6500. Science Curriculum and Instruction. Examination of current curriculum standards, trends, and effective methods of instruction for science in middle and secondary schools. Emphasizes science program improvement through investigative lab activities. (2Su)

6550. Social Studies Curriculum and Instruction. Examination of current curriculum standards, trends, and effective methods of instruction for social studies in middle and secondary schools. (2Su)

6580. Character and Values Education. Overview of research, theory, and practical approaches to values education, emphasizing processes of moral development and socialization. (2Su)

***6600 (d4600). Philosophy and Organization of the Middle Level School.** Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. (3F,Su)

****6610 (d4610). Curriculum, Methods, and Assessment for the Middle Grades.** Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. To receive credit for 6610, graduate students design and implement an action research project related to curricular or pedagogical interests, then share their findings in class. Project will include review of literature related to student's interest. Prerequisite: ElEd/ScEd 6600. (3Sp,Su)

6620 (d4620). Service Learning Applications for the Middle Grades. Examines literature related to service learning for the middle grades. Application of service learning in curriculum. (3Su)

6900. Independent Study. Individually directed readings and conference. Departmental permission required before registration. Prerequisite: Instructor's approval. (1-3F,Sp,Su) ®

6910. Independent Research. Individually directed research projects. Departmental permission required before registration. Prerequisite: Instructor's approval. (1-3F,Sp,Su) ®

6940. Supervision and Administration Internship. Individually directed internship experiences in secondary school settings for development of supervisory and administrative skills. Prerequisite: Instructor's approval. (3F,Sp,Su)

6960. Master's Project. Individually directed portfolio project or creative project, with a focus closely related to coursework or to area of teaching specialization. Designed for use on MEd degrees only. Prerequisite: Instructor's approval. (3F,Sp,Su)

6970. Master's Thesis. Individually directed work in thesis writing, with guidance from committee chair. Designed for use on MA and MS degrees only. Prerequisite: Instructor's approval. (3-6F,Sp,Su)

6990. Continuing Graduate Advisement. (1-9F,Sp,Su) ®

7000. Student Teacher Supervision. Experiences in providing guidance for secondary student teachers in public schools. Analysis of roles and responsibilities of cooperating teachers and university supervisors. Prerequisite: Instructor's approval. (1-3F,Sp)

7050. Internship in Program Evaluation. Experiences in practical aspects of program evaluation through planned and supervised evaluation project participation. Must be approved by student's graduate committee. Prerequisite: Instructor's approval. (1-6F,Sp,Su)

7060. Internship in Research. Experiences in conducting research through planned and supervised research project participation. Must be approved by student's graduate committee. Prerequisite: Instructor's approval. (1-6F,Sp,Su)

7330. Internship in Supervision. Directed experiences in supervision with selected public school personnel in approved settings. Experiences arranged by student's graduate committee. Prerequisite: Instructor's approval. (1-3F,Sp,Su)

7350. Internship in Curriculum Development. Directed experiences in curriculum development with selected public school personnel in approved settings. Experiences arranged by student's graduate committee. Prerequisite: Instructor's approval. (1-3F,Sp,Su)

7500. Interdisciplinary Workshop. Prerequisite: Instructor's approval. (1-3Su) ®

7810. Research Seminar. Identification of research problems, consideration of research methods, and application of data analysis procedures under faculty direction. Prerequisite: Instructor's approval. (1F,Sp,Su) ®

7900. Independent Study. Individually directed reading and conference. Departmental permission required before registration. Prerequisite: Instructor's approval. (1-3F,Sp,Su) ®

7910. Independent Research. Individually directed research projects. Departmental permission required before registration. Prerequisite: Instructor's approval. (1-3F,Sp,Su) ®

7970. Dissertation. Individual work on research problems in the PhD or EdD program. Prerequisite: Instructor's approval. (1-12F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Interdepartmental Program in
Social Sciences

Degree Coordinator: Dean *Stan L. Albrecht*, College of Humanities, Arts and Social Sciences
Office in Main 338, (435) 797-1195

Degree offered: Master of Social Sciences (MSS)

Major Disciplines (specializations): Economics, History, Human Resource Management, and Sociology

Minor Disciplines: Anthropology, Business Administration, Instructional Technology, Economics, Family and Human Development, Geography and Earth Resources, History, Political Science, Psychology, Social Work, Sociology, and Management and Human Resources

Graduate Program

Administration

The program is administered by a committee of the department heads (Management Committee) from the four major disciplines or their designees. The committee is chaired by annual rotation by one of the members of the committee, and reports to the Degree Coordinator. The Management Committee reviews policy and develops recommendations which are submitted to the Degree Coordinator for approval.

Degree Description

The social sciences are disciplines that have as a common objective the understanding of human behavior and social relationships. The MSS offers multidisciplinary graduate training for candidates desiring in-depth applied understanding of human performance, human environments, and/or the structuring of social, political, and economic systems. There are Plan B and Plan C options in the MSS Program. Students in Economics, History, and Sociology typically follow the Plan B option, while Human Resource Management students typically follow the Plan C option. The Plan B option requires a minimum of 30 credits and the Plan C option requires a minimum of 33 credits. Both options require a minimum of 15 credits in a major discipline plus a minimum of 15 credits from one of the following two tracks: *Track A:* a minimum of 15 credits from two approved minor areas, with at least two courses in each minor area. *Track B:* a minimum of 15 credits from an approved minor and a cluster, with at least two courses in the minor and two courses in the cluster. Courses counted in a cluster must be outside the selected major and minor. Three of the 30 credits required for the Plan B option must be thesis credits, but no more than 3 credits of thesis can be counted toward a degree. Plan C requires 33 credits of coursework with no thesis credit allowed. Departments may impose more rigorous requirements. A maximum of 3 credits may be earned either from readings/conferences or from independent research.

The MSS degree is primarily intended to prepare degree recipients for employment or advancement in social science-related occupations. Students interested in pursuing doctoral work should consider a Plan A Master of Science program.

Admission Requirements

See general admission requirements, pages 60-61. In addition, the faculty of each discipline determines whether to recommend to the graduate dean the acceptance of applicants. For further information, contact the Graduate Coordinator in the department of the proposed major.

Specializations

Program specializations and emphases and the qualifications for each are summarized below.

Economics. The areas of emphasis in Economics include Labor Economics, Economic History/Comparative Economic Systems, Business and Government, Economic Education, Environmental Economics, Trade and Development, and Rural Economic Development. Acceptable minor fields include any of the cooperating minor disciplines.

History. The MSS in History is designed for secondary teachers who want more training to certify in additional teaching

fields. Acceptable minor fields include Instructional Technology, Economics, Geography, Political Science, Psychology, and Sociology/Anthropology.

Human Resource Management. Human Resource Management deals with those processes that provide, develop, and maintain a productive workforce in a dynamic and changing environment. Subject areas include human resource planning; recruiting; selection; placement; compensation and benefits; performance management; career planning, training, and development; labor relations; and ethical/legal employment practices. Individuals interested in a general management program are referred to the College of Business MBA Program.

Sociology. The Sociology Program offers coursework in sociological theory and methods/statistics and has four emphases: Sociology of Development, Demography, Social Problems, and Environmental Sociology. The MSS specialization in Sociology is well-suited to individuals with interdisciplinary interests that include one of these areas of departmental strength. International Rural and Community Development is a currently well-developed option within the Sociology of Development emphasis. Other options may be arranged in consultation with the student's supervisory committee.

Degree Requirements

Student Supervision. For each student admitted, a supervisory committee is ordinarily appointed consisting of at least one faculty representative from the student's major discipline and (a) one from each of the minor disciplines, or (b) one from a minor discipline and one from a discipline associated with the cluster. Policies governing student supervision may vary from specialization to specialization.

Plan C Culminating Experience. Each major discipline has an integrative requirement toward the end of the student's program for the Plan C option. The requirement may include a comprehensive examination, a capstone course, and/or an integrative project.

Plan B Research Paper. Each Plan B student must submit a research paper for thesis credit in accordance with School of Graduate Studies and departmental requirements. Ordinarily, the Plan B paper is written in the major discipline, but in some cases, with the approval of the student's supervisory committee, it may be written in one of the minor disciplines. Information specific to each major discipline may be obtained by contacting the sponsoring department.

Further Information

Candidates interested in pursuing this degree program may obtain specific information by contacting the head of one of the participating departments, the School of Graduate Studies, or the dean of Humanities, Arts and Social Sciences.

Department of
Sociology, Social Work and Anthropology

College of Humanities, Arts and Social Sciences

Head: Professor *Gary H. Kiger,* social psychology; gender, work, and family; research methods
Office in Main 224, (435) 797-1230

Assistant Head and Director of Graduate Studies: Professor *Richard S. Krannich*, environmental, community, and rural sociology; research methods

FAX (435) 797-1240
E-mail pwilson@wpo.hass.usu.edu
WWW http://www.usu.edu/~sswa

Professors *Richley H. Crapo*, religion, sex, and gender; sexuality and Homosexuality; *H. Reed Geertsen*, community, sociological theory, medical; *Yun Kim*, demography, development, quantitative methodology; *David F. Lancy*, educational anthropology, ethnography; *Ann Leffler*, social psychology, theory, rural, family, gender; *Ronald L. Little*, environmental sociology, rural, quantitative methodology; *Jon R. Moris*, applied anthropology, rural development, contemporary Africa; *Bradley W. Parlin*, comparative sociology of work; *Pamela J. Riley*, social psychology, international development, criminology, gender; *David L. Rogers*, complex organizations, political sociology, communities; *Steven R. Simms*, archaeology, anthropological theory, behavioral ecology; *William F. Stinner*, social demography, life course, community; *Michael B. Toney*, demography, ecology; **Professors Emeriti** *Wade H. Andrews*, social organization, natural resources, ecology; *Therel R. Black*, theory, rural sociology; *H. Bruce Bylund*, social change, methods; *William A. DeHart*, social psychology, gerontology; *Gordon N. Keller*, comparative kinship, applied anthropology; *Wesley T. Maughan*, community organization, sociology of education; *Alison C. Thorne*, marriage and family; **Associate Professors** *E. Helen Berry*, demography, ecology, methods, urban; *M. Diane Calloway*, women's development, women's clinical and societal issues, social work theory; *Susan E. Dawson*, social policy, program development; *Gary E. Madsen*, environmental sociology, social stratification; *Derek T. Mason*, juvenile delinquency; **Adjunct Associate Professor** *Dale J. Blahna*, natural resource sociology, policy, and outdoor recreation, *Joanna L. Endter-Wada*, cultural anthropology and natural resource policy and sociology; **Assistant Professors** *William B. Fawcett*, archaeology, ethnohistory, cultural resource management; *Bonnie Glass-Coffin*, medical anthropology, shamanism; *Lori M. Hunter*, demography, environmental sociology,

quantitative analyses and geographic information systems; *Patricia M. Lambert*, biological anthropology, bioarchaeology, paleopathology; *Terry L. Peak*, social policy, health care, gerontology; **Adjunct Assistant Professors** *Nazih T. Al-Rashid*, sociology of work; *Sue H. Guenter-Schlesinger*, diversity; *Don C. Larson*, demography; *Janet L. Osborne*, sociology of gender; *Douglas N. Sharon*, cultural anthropology; *Bryan R. Spykerman*, research methods; **Assistant Professor Emeritus** *Alice C. Smith*, sociology

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Sociology; participates in Master of Social Sciences (MSS); BS and BA in Social Work; BS and BA in Anthropology

Graduate Specializations: *PhD*–Demography, Environmental Sociology/Sociology of Natural Resources, Social Problems, and Sociology of Development

Undergraduate Programs

Objectives

The department offers educational programs for students to prepare for positions in business, social welfare, teaching, research, personnel, government service, law enforcement, and industry, as well as providing liberal and general education for all interested students. The program offers a wide range of courses for the study of social, cultural, and behavioral dynamics. The department also provides University Studies (General Education), Liberal Arts and Sciences, and other service courses for students from all majors.

Requirements

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to the sociology and anthropology majors, as well as to the pre-social work major. Transfer students from other USU majors or other institutions must have a minimum 2.5 overall GPA. For admission to the sociology major, students must additionally have earned a grade of *C-* or better in Soc 1010. For admission to the social work major, transfer students must have earned a minimum 2.75 GPA in all social work classes. Applicants to the social work major must have completed the basic social work core curriculum, must have a minimum 2.5 overall GPA and a minimum 2.75 GPA in social work classes, must have completed SW 1050 with a grade of *C+* or better, and must have completed an application form (available from the department).

Sociology

Undergraduate Program Coordinator: *Gary E. Madsen*
Program Office: Main 224, (435) 797-1230

The study of the human individual and human groups is central to sociology. These subjects offer a broad foundation for understanding human behavior on an individual and group basis, and encourage the development of skills necessary for establishing favorable societal conditions for human development.

Students learn to systematically describe and explain group behavior, including the effects of one group on another and of groups upon individual behavior. Required sociology classes deal with how people in different societies organize and control their societies, critical issues in sociology as they have developed through history, and statistical methods for analyzing sociological data.

Upon completion of the prescribed program for a major in sociology, the student should be able to:

1. Demonstrate knowledge essential for understanding society from a sociological perspective;

2. Identify and critically evaluate the contributions of sociologists, social scientists, and scholars;

3. Identify and critically evaluate the forces and institutions that influence his or her life as a member of society;

4. Identify, comprehend, and critically evaluate the influences of race, class, gender, age, and disability on a member of society;

5. Pursue careers in sociological areas, business, government, and/or graduate study; and

6. Apply the methods and concepts of sociology to the analysis of social issues, problems, and conflicts in preparation for participation as agents of creative social change.

Students select courses from three different areas. **Social problems** classes focus on retirement and other aspects of aging, the causes and prevention of juvenile delinquency, and the cultural characteristics of minority groups. **Groups and institutions** courses look at collective behavior, the organization of communities, and the development of gender roles, as well as economic systems, educational systems, and social inequality. **Population, environment and development, and human ecology** courses deal with the effects of the environment and human behavior and the consequences of different patterns of population growth and settlement. A Law and Society Area Studies Certificate is available. A teaching major in sociology is available for students wishing to teach in secondary schools.

Surveys of graduates indicate that sociology majors pursue a wide range of occupations. About one-third are employed in the professional sector, while close to one-fourth are in service occupations. In addition, 26 percent are involved in sales or management/administration. In terms of specific job titles, social service is a popular option, as are retail sales and teaching. Other frequent job titles include: vocational rehabilitation counselor, research analyst, data coordinator, management analyst, district sales manager, parole officer, juvenile probation officer, social

services director, civil service test examiner, personnel director, insurance salesman, and correctional service officer. A variety of government and business positions are also expanding for sociology majors with the new emphasis on a liberal arts education. The growing awareness of the value of sociological perspectives for problem-solving continues to provide an increasing range of opportunities for employment in a variety of work settings.

Departmental Graduation Requirements. Sociology majors must meet the following course requirements:

1. Complete the general requirements of the University. Majors are expected to take Stat 1040 to fulfill the quantitative literacy requirement for University Studies (General Education).

2. Complete a minimum of 33 credits of sociology coursework. At least fifty percent of the sociology coursework should be completed in the USU Sociology program. Sociology majors must maintain a minimum GPA of 2.5 in sociology courses and earn a grade of *C-* or better in courses to be counted toward the major.

3. A minor outside the program is encouraged but not required.

4. Complete the following required courses: Soc 1010, 3010, 3110, 3120, and 4010.

5. Choose a minimum of 18 credits from the following sociology elective courses. At least 3 credits must come from each of the three specialty areas listed below.

a. *Social Problems:* Soc 1020, 3410, 3420, 3430, 3750, 4420.
b. *Groups and Institutions:* Soc 2500, 3320, 3330, 3500, 4330.
c. *Population, Environment, and Development:* Soc 3200, 3600, 3610, 4620, 4710, 4730, 5650/6650.

Sociology and Social Work Dual Major. Sociology majors desiring additional preparation for employment in the social services may complete a dual major in sociology and social work. With the help of advisers, students who will seek positions in other special areas could include appropriately related courses.

Minor. Students minoring in sociology must complete a minimum of 12 credits in sociology courses. Soc 1010 and 1020, as well as six additional credits with a Soc prefix, are required.

Teaching Certificate. Sociology is defined as an approved teaching major in Utah secondary schools by the State Board of Education. The sociology major must complete a minor in a subject that is required in Utah high schools. In addition to completing the courses required for the sociology major, the sociology teaching major must also complete the required teaching certificate courses in education. Students can also elect sociology as an approved teaching minor.

Law and Society Area Studies. The Department of Sociology, Social Work and Anthropology sponsors an interdisciplinary program emphasizing the study of the relationship between law and society. Students must complete 24 credits, chosen from a selected list of courses, in at least three disciplines. A minimum 3.0 GPA must be maintained in these courses.

The selected courses are: MHR 2990, 3810; Phil 4600, 4900; Comm 4030; PolS 3120, 3130, 3810, 4120, 4130; SW 5350; Soc 1020, 3410, 3420, 3430, 4420. Only 12 credits may be selected from a single discipline. The Law and Society Area Studies program is pursued in conjunction with a major. Credits may be applied to the major, as well as to the area studies requirements. A student's transcript will reflect the Law and Society Area Studies emphasis upon completion of requirements for a degree.

More information may be obtained from the department or from the Science/HASS Advising Center, Student Center 304.

Gerontology Program. The Department of Sociology, Social Work and Anthropology is one of several departments sponsoring an interdisciplinary gerontology program, which prepares students for careers in the field of aging. Students may earn a certificate in gerontology by completing a selected list of course requirements, including supervised field practicum in a gerontological setting.

More information concerning the gerontology certification program may be obtained from the Department of Family and Human Development.

American Studies Major. The Department of Sociology, Social Work and Anthropology is one of several departments offering an area of concentration for the American Studies program. Students who wish to focus their work in American culture should refer to the American Studies program description (page 193) and check with the Sociology program for further information.

Social Work

Program Coordinator: *M. Diane Calloway*
Program Office: Main 239, (435) 797-1286; or Main 224, (435) 797-1230

The Social Work Program provides a learning environment for those seeking to acquire knowledge and skill in order to bring about meaningful social change in individuals, groups, communities, and society in accordance with democratic principles of civil, social, political, and economic justice. The program is committed to the realization of the goals of the American people through recognized practice principles of the social work profession, and to the resolution of contemporary human social problems such as poverty, racism, discrimination, exploitation, economic injustice, poor housing, malnutrition, alienation, and inadequate education.

Social Work at Utah State University recognizes the historic importance of social welfare in balancing the country's economic and social structure. Correspondingly, the mission of the program is to prepare social workers for practice in a diverse society that has been unable to meet the needs of a vast segment of its people, and to equip students with the knowledge and skills essential to the general tasks of promoting social welfare in institutions such as education, health, employment, housing, and criminal justice.

The program's guiding educational philosophy is based on two broad traditions: the land-grant university heritage and generalist

social work practice. Therefore, the program is directed toward providing grounding in the fundamental generic skills, knowledge, and values of social work; is dedicated to research, extension, and service to the profession and the State of Utah; and is reflective of the fundamental need to adjust social institutions to the democratic and egalitarian ideals of both the University and the social work profession.

Program Goals

Two fundamental goals guide the Social Work Program:

1. Preparation of qualified students for employment at the beginning level of professional social work practice, through education in a professional foundation curriculum and selected liberal education coursework. Preparation of students for advanced professional and continuing education.

The program is based on a generalist conception of social work, as well as on problem-solving, empowerment, and strengths models of practice. The social work sequence stresses problem solving at the interface of person and environment, which requires that students develop a repertoire of generalist practice skills. The program inculcates in students the knowledge, skills, understanding, and values necessary to perform multi-level assessments and interventions utilizing a theoretical knowledge base. The program is committed to building a student's education on a solid base, which includes a liberal arts perspective vital to the development of a social worker.

The program endeavors to prepare students for advanced standing in graduate professional programs, as well as to provide a solid academic base for continuing education. To accomplish this, the program is designed to facilitate the development of the profession's knowledge, values, and skills, and provide a well-rounded liberal arts educational foundation, good study habits, written and oral communication skills, and the ability to think critically.

2. Preparation of students to contribute to the profession of social work and to the delivery of human services through research and service at the national, regional, and local levels.

The program encourages faculty and students to develop research and training grants; to present papers at national, regional, and local meetings; and to publish scholarly research in professional journals and extension publications. Also supported are faculty training, research, and consultation activities to improve the quality of human services in Utah and the region. This goal grows out of the research and extension mission of Utah State University as a major land-grant institution.

Social Work Major

Licensure and State Merit System. The baccalaureate social work program at Utah State University is accredited by the Council on Social Work Education and meets the requirements set by the State of Utah for certification of social service workers.

Liberal Arts Foundation. All students pursuing an undergraduate degree at Utah State University must meet requirements designed to assure a broad, solid liberal arts foundation. Cross-cultural and cross-disciplinary perspectives are vital to a student's development as a social worker. The University Studies (General Education) program, which is described in detail in this catalog (see pages 50-53), is required of all majors. Majors are expected to take Stat 1040 to fulfill the quantitative literacy requirement for University Studies. In addition to fulfilling University Studies requirements, students must complete specific liberal arts courses, listed in the Social Work Program requirements. Some of these courses fulfill both University Studies and Social Work Program requirements.

Program Pre-Admission Requirements. The following requirements apply to students desiring admission to the Pre-Social Work Program: (1) New freshmen admitted to USU in good standing qualify for admission to the Pre-Social Work Major; (2) Transfer students from other institutions must obtain a minimum overall GPA of 2.5 and a minimum overall GPA of 2.75 in Social Work classes (refer to USU Social Work Program *Transfer of Credit Policy*); (3) Students transferring from other USU majors must complete the Pre-Social Work Major course of study and must obtain a minimum overall GPA of 2.5 and a minimum overall GPA of 2.75 in social work classes; and (4) Students are responsible for reviewing and knowing the requirements for the Social Work degree.

Procedures for Admission to the Major. In order to be considered for admission to the Social Work major, students must turn in a completed application form by September 5 of the academic year. Applications for admission to the major can be obtained in the Social Work Office, Main 239.

To be considered for admission to the major, students must meet the following minimum criteria: (1) Completion of all courses for the Pre-Social Work Major: SW 1050; FHD 1500; Engl CL 1010; Biol BLS 1010; Soc 1010; Psy 1010, 3210; (2) Sophomore status (30-59 credits completed) upon application; (3) Completion of SW 1050 with a grade of *C+* or better; and (4) Minimum overall GPA of 2.5 and minimum GPA of 2.75 in social work classes.

During the month of September, Social Work faculty will review applications to the major. Admission will be based on the criteria listed above and on the student's capacity for engaging in professional conduct. The number of students admitted to the major is guided by the need to maintain the highest quality of instruction and training. In addition, the Council on Social Work Education, which accredits all social work programs, requires that a faculty-to-student ratio of 25 to 1 be maintained. The Social Work Program must adhere to these guidelines in order to maintain its accredited status. In the event more students apply for admission than the program can accommodate, students will be ranked by GPA, and the top 25 students will be admitted to the program.

Students should also be aware that if there is any personal data, such as that included on the application for state licensure, which indicates a potential threat to the public safety and welfare, a student may be denied admission to the program. Students turned down for admission will be assisted by faculty in finding a more suitable major. If a student is denied admission to the program, his or her file will be reviewed upon request.

To maintain matriculation as a Social Work Major, a student must obtain a *B-* or better in SW 3050, 4150, and 4160; and must maintain a minimum overall GPA of 2.5 or better and a minimum 2.75 GPA in the Social Work Major.

Social Work Major. Upon admission to the Social Work major, all students must complete: Engl CL 2010; SW 2400, 2500, 3050, 4100, 4150, 4160, CI 5350; and Soc QI 3120. **Note:** Prior to enrolling for SW 3050, students must apply to the Social

Work Major and be officially accepted into the program.

Nine credits of required electives must be chosen from the following courses: SW 3350, 3360, 3650, 3750, and 4900. SW 4950 may be used as an optional elective.

Students must take the following practicum coursework during their senior year and upon application: SW 4870 and 5870.

Social Work majors are strongly encouraged to join the National Association of Social Workers (NASW). Applications are available from the Social Work Program's main office in Main 239. Students are also encouraged to be involved in the NASW Student Program Unit.

Procedures for Admission to Field Practicum. Students must complete 480 clock hours of supervised field practicum and integrative seminar coursework. The field practicum courses are SW 4870 (6 credits) and SW 5870 (6 credits). Students may register for SW 4870 only after making application with the practicum director. Applications must be submitted during the spring semester of the academic year prior to enrollment in the practicum and are due by February 20. Applications are available in Main 239. No applications for the practicum will be accepted from students who will not complete all required coursework by the end of spring semester.

The following are eligibility criteria for admission to the field practicum: (1) Junior status (60-89 credits completed) upon application. Only those students who are candidates for the baccalaureate degree in social work may be admitted to the field practicum; (2) Completion of University Studies program and all Social Work courses with the exceptions of SW 4100 and 5350; (3) A grade of *B-* or better in SW 3050, 4150, and 4160; (4) Demonstration of appropriate, professional moral and ethical character, and must abide by the National Association of Social Work (NASW) code of ethics; (5) Maintenance of an overall minimum GPA of 2.5 and a 2.75 minimum GPA in the Social Work Major.

Students should also be aware that if there is any personal data, such as that included on the application for state licensure, which indicates a potential threat to the public safety and welfare, a student may be denied continuation in the program. If a student is denied admission to the practicum, his or her file will be reviewed upon request.

Students entering the practicum cannot ordinarily begin their placement earlier than the start of fall semester. If they do so, this practice falls outside of the Social Work Program's responsibility, and any accrued hours will not count toward the practicum.

Students entering the field practicum are strongly encouraged to join the NASW and be involved in the NASW Student Program Unit.

Transfer of Credit Policy. Students who transfer to the USU Social Work Program are required to complete an application for transfer credit. Students may substitute Social Work classes taken at other Council of Social Work Education (CSWE) accredited programs for USU courses. Approval must be sought from the student's adviser. When petitioning for a substitute, the student is responsible to fill out a transfer of credit form available in Main 239. Social Work courses taken ten or more years ago *cannot* ordinarily serve as substitutes. Courses taken in a department or program *not accredited* by the CSWE *cannot* ordinarily serve as substitutes for the USU Social Work courses *unless* they have been covered in an articulation agreement. Courses not covered in an articulation agreement *will not* be granted equivalency.

The transfer credit application must be submitted with official transcripts from all previous institutions attended. The transcripts submitted must reflect a cumulative grade point average of at least 2.5 (on a 4.0 scale). The credentials of students seeking transfer to the Utah State University Social Work Program will be evaluated on an individual basis.

The following courses will be considered for transfer credit: *Pre-Social Work requirements*—SW 1050, FHD 1500, Engl 1010, Biol BLS 1010, Soc 1010, Psy 1010; *Social Work major requirements*—Engl 2010, SW 2400, SW 2500.

Transfer students should complete all of the Pre-Social Work requirements, with the exception of Psy 3210, Abnormal Psychology, to be considered for admission to the major.

Students transferring will be required to take social work upper-division courses at USU. Only those social work courses taken within the last ten years will be considered.

Students transferring credits from CSWE accredited programs must take at least 50 percent of their social work courses at USU.

Anthropology

Program Coordinator: *Steven R. Simms*

Program Office: Main 245, (435) 797-0219; or Main 224, (435) 797-1230

Anthropology is the integrated study of human beings in all their aspects. It offers a broad framework for understanding human beings and society through courses dealing with the biological evolution of human beings, prehistoric culture change, and present diversity of cultures and human types.

Anthropology is distinguished in its use of both scientific and humanistic approaches to study the nature of humankind in all its complexity. Anthropologists utilize scientific techniques first developed in the natural sciences to identify discrete problems and develop testable hypotheses. At the same time, anthropologists build theory which explains the experience of being human in terms accessible to the mind. As one of the humanities, anthropology also interprets cultures in ways that make the “alien” more meaningful and understandable to members of other societies. With its emphasis on holism, the field avoids much of the particularism which renders considerable portions of science inapplicable to the ordinary experience of life.

The contemporary social science student lives in a world of diminishing cultural and national barriers. In this setting, ethnocentrism and provincialism emerge as principal impediments to human and material progress. Anthropology's tradition of cultural relativism and its focus on describing the complex unity

of human behavior prepares students to adapt quickly and successfully to a wide range of jobs.

Anthropology includes a range of subspecialties: cultural anthropology, biological anthropology, archaeology, and linguistics. Major requirements are designed to encourage broad exploration across anthropology.

Special features of the Anthropology Program include small courses, individual attention, use of rhetoric associates to improve writing skills, and undergraduate teaching assistants and peer advisers who are anthropology majors. The Anthropology Museum, Archaeology Field School, and Archaeology/Physical Anthropology Laboratory provide hands-on learning opportunities.

Anthropology serves applied interests in international development, archaeology and cultural resource management, cross-cultural health care, and osteology/forensics. Anthropology participates in the Department of Geology option in Geoarchaeology, the American Studies Program, and the Folklore Program.

Major Requirements. A minimum of 31 credits is required for the anthropology major. Of the 31 minimum credits, 28 credits are required or structured. All students must take six required courses, including a three-semester sequence in the basic areas of anthropology, a beginning upper-division level course in the history of anthropology, a capstone course in contemporary theory, and completion of a senior project. The anthropology major also requires exposure across the breadth of the discipline. To achieve this, students select courses from topical and area clusters at the upper-division levels. Additional graduation requirements include:

Methods component. Majors must complete three courses designated as "Methods" courses. The courses chosen to meet this requirement may also count toward other anthropology major requirements.

A minimum of 16 credits of the anthropology course credits counting toward the major must be Utah State University courses. Credits from distance and residence center courses are subject to departmental approval for application toward the anthropology major.

Students majoring in anthropology must maintain a minimum 2.5 GPA in anthropology courses. A grade of *C* or better must be attained in courses counted for the major, including foreign language and statistics courses. In addition, majors must: (1) complete the general requirements of the University in consultation with the student's adviser; (2) complete the following required courses: Anth 1010, 1020, 1030, 3990, 5980, 5990; (3) choose a minimum of one course from: Anth 2100, 3110, 3120, 3130, 3300; (4) choose a minimum of one course from: Anth 3160, 3170, 3180, 3200, 3250, 3350, 3400; (5) choose a minimum of one course from: Anth 4110, 4120, 5100, 5140, 5160, 5650; (6) choose a minimum of one course from: Anth 4130, 4200, 4250, 4350, 4360; and (7) choose the remaining credits for the major from any anthropology courses.

Students planning to receive a BA degree must complete two years training or equivalent in a foreign language approved by the Languages and Philosophy Department or one year or equivalent in each of two foreign languages approved by the Languages and Philosophy Department.

Students planning to receive a BS degree must complete Stat 1040 (Introduction to Statistics), **and** either Soc 3120 (Social Statistics I) **or** Stat 2000 (Statistical Methods.)

Anthropology majors are encouraged to complete both the foreign language and statistics requirements.

Minor Requirements. A minimum of 18 credits is required for the anthropology minor. A minimum of 12 anthropology credits counting toward the minor must be Utah State University courses. Credits from distance and residence center courses are subject to departmental approval for application toward the anthropology minor. Students must maintain a minimum 2.5 GPA in anthropology courses. A grade of *C* or better must be attained in courses counting toward the minor.

The following courses are required for the anthropology minor: Anth 1010, 1020, 1030 (9 credits). In addition, students must complete three upper-division (3000-5000 level) courses (9 credits) in anthropology, excluding Anth 5900 (Independent Studies), Anth 5310 (Archaeology/Physical Anthropology Lab), and Work Co-op.

Sociology Graduate Program

Students must have scores on the verbal and quantitative portions of the Graduate Record Examination (GRE) at or above the 40th percentile. TOEFL scores are required for international candidates, with a minimum score of 600 deemed acceptable. The Test of Spoken English (TSE) is also strongly recommended, with a minimum score of 50 deemed acceptable. International applicants who are admitted without having taken the TSE will be required to take a test of spoken English fluency administered by the Intensive English Language Institute (IELI) at Utah State University prior to beginning their first semester in the Sociology Graduate Program. Dependent upon the test results, the student may be required to complete a program of English language training during the first semester of residence in the graduate program. For consideration for admission to the MSS degree program, applicants may submit either GRE or Miller Analogies Test scores.

Applications are screened throughout the year by the Graduate Program Executive Committee. No applications will be considered until all required information arrives in the School of Graduate Studies or a formal petition to review a nearly-complete file is made and approved.

Students with or without an undergraduate degree in sociology may enter the master's degree program. However, before matriculating, basic competencies in sociology that have not been acquired through prior courses or experience must be satisfied. Students entering the doctoral program must complete master's level prerequisites in sociological theory and research methods and statistics.

PhD in Sociology

In addition to coursework in sociological theory and methods, students are expected to concentrate in two of the following specialty areas. Specialty areas are distinct, but are also highly integrative. One line of integration involves the department's continuing emphasis on **Rural Sociology**, which links elements of all four specialty areas. The program is sufficiently flexible to permit students with a strong interest in an area other than the established specialty areas to elect that area as an emphasis area, rather than having a second specialization, with approval of the supervisory committee and the department head or his or her delegated representative. In this case, the student would select a series of courses in that area in consultation with his or her supervisory committee and the department head or his or her delegated representative.

Demography. The demography area of specialization is administered through the Population Research Laboratory. The orientation is twofold: (1) basic and policy-oriented research on sociological aspects of demographic structure and processes, including migration, marriage and fertility, morbidity, and mortality; and technical demographic topics such as population estimates and projections; and (2) the provision of demographic training to domestic and international students relevant to their respective settings. Research endeavors encompass a broad range of local, regional, national, and international projects in the areas of migration and population redistribution, family demography, life course and aging, health and disability, labor force, and population estimates and projections. Graduate coursework is provided in social demography, population theories and policy, and demographic methods, as well as through various special topic seminars.

Social Problems. The social problems area is a specialization focused on theoretical and research-related issues relevant to a range of topics currently defined as “social problems.” Students will find a good deal of flexibility in the program, allowing them to pursue special interests. The faculty members affiliated with this specialty area are actively involved in social problems research.

A number of themes are emphasized in each of the specific content courses for the social problems area. For example: How are social problems defined? What identifiable interest groups are involved in defining social problems? How do responses to social problems vary across time, place, and group? Examples of specific content courses this area may include are: criminal justice, aging, gender, race and ethnic relations, mental health, sexuality, social change, stratification, science and technology, medicine, and work.

Environmental Sociology/Sociology of Natural Resources. The faculty in this area maintain an active research involvement in a wide variety of areas, such as energy development, boom towns, land use planning, public participation in environmental planning, hazardous facility siting, recreation, risk assessment, population/environment relationships, public land management issues, and natural resource policy and management. Faculty have been engaged in cooperative research ventures with engineering, natural resource sciences, and other physical and social sciences faculty. Graduate curricula offerings are focused on the sociology of natural resources, environmental sociology, population and environment, and social risk analysis.

Sociology of Development. This specialization focuses on both domestic and international issues. Two major goals of the program are to give students the conceptual and analytic foundations to understand development, and to convey specific skills required for effective performance in applied fields. The basic curriculum includes courses covering a broad range of topics related to processes in local, national, and international development, including rural sociology, international development, women and development, applied anthropology, and economic development.

Core Courses. The core courses for the PhD degree in Sociology include Soc 7010, 7100, and 7110.

MS and MA in Sociology

The main objective of this degree program is to provide a firm foundation in sociological theory and methods. Students also have the opportunity to take electives in any of the departmental specialty areas or outside the department.

Core Courses. The core courses for this degree include Soc 6010, 6020, 6100, and 6150. The ability to utilize a statistical package (or permission of instructor) is a prerequisite to Soc 6150. Such competence may be gained by taking Stat 4910 (SPSS Shortcourse, 1 credit) or Stat 4920 (SAS Shortcourse, 1 credit).

MSS Sociology Specialization

This specialization enables interdisciplinary training in three related disciplines. The program requires a minimum of 35 credits, including 17 credits in a major discipline (Sociology); and either (1) a minimum of 9 credits in each of two minors *or* (2) a minimum of 9 credits in a minor and a minimum of 9 credits in a cluster. Two credits for the Plan B paper are included in the minimum 17 credits in Sociology. A minimum overall GPA of 3.0 is required. This is an applied degree. Individual options and plans of study can be arranged in consultation with the student's supervisory committee. At present, the degree is available with an emphasis in International Rural and Community Development; other emphases may be added in the future.

International Rural and Community Development. This emphasis is designed to prepare administrators, planners, and researchers for work in international settings. The emphasis is on social and community factors in development. The interdisciplinary curriculum in sociology of development, rural sociology, economic anthropology, political science, and the economics of development has been specifically designed to prepare practitioners and leaders for careers in applied social development. The coursework can be adapted to the individual career interest of each student. The program involves students both from abroad and from the United States.

Core Courses. Individualized programs of study are prepared with the cooperation of the student and supervisory committee.

Research

The graduate program's research agenda is focused within the framework of the department's specialty areas. Since the areas are integrative, research tends to involve collaborative participation by several faculty members. Several active research projects are supported by the Utah Agricultural Experiment Station. Research is conducted at various levels, including international, national, regional, and state. The department houses two active research

units, the Institute for Social Science Research on Natural Resources, and the Population Research Laboratory. Faculty play key roles in several interdisciplinary research units, including the Institute for Rural and Community Development and the Women and Gender Research Institute. Graduate program faculty are frequently involved in the research activities of other research units on campus, including the Center for Persons with Disabilities, the Utah Water Research Laboratory, the Mountain West Center for Regional Studies, and the International Irrigation Center.

Financial Assistance

Both departmental support and formal research grant support are available to graduate students and are awarded on a competitive basis. Some highly qualified departmental graduate students are also nominated to compete for University fellowships. Students who wish to be considered for financial aid must submit applications by February 1 for the coming academic year. Financial aid forms are available from the Department of Sociology, Social Work and Anthropology. Late applications are considered only if additional funds are still available.

Teaching assistantships are available through the department. Research assistantships are available through faculty members who have ongoing projects with the Utah Agricultural Experiment Station or who have research grants from the University, private companies, and federal or state agencies.

Career Opportunities

Traditionally, persons with advanced degrees in sociology have been employed in college and university settings. Recent evidence has shown a greater variety of career paths. A survey conducted by the American Sociological Association showed that 21 percent of sociologists holding the doctoral degree were employed in the private sector; 31 percent were working in the nonprofit sector; 46 percent were working in federal, state, or local government agencies; and 12 percent were self-employed. USU sociology graduates have followed this pattern of diversity. They have secured appointments in a variety of academic, governmental, and private settings, both domestic and abroad. A sizeable number have achieved key leadership positions and high visibility in the profession.

Sociology Courses (Soc)

BSS 1010. Introductory Sociology. Examination of social behavior of humans and social institutions. Theories and methods for studying society and social issues, along with insights from related disciplines. (3F,Sp)

1020. Social Problems. Study of major U.S. and international social problems. Examination of how issues are defined as social problems and ways groups attempt to solve the problems. (3F,Sp)

2500. Sociology of Gender. Examines impacts of social constructions of gender on individual and collective experience. Investigates how gender is shaped through social processes and through the effects of social institutions. Particular attention given to relation of gender to social stratification. (3F)

3010. Race, Class, and Gender. Examines theories and research concerning how race, class, and gender intersect in the lives of societal members. (3F,Sp)

CI 3110. Methods of Social Research. Methods and techniques of analyzing social data. Examines surveys, field research, observational studies, and other social science techniques. Emphasizes analysis of data and published research. (3F,Sp)

QI 3120. Social Statistics I. Examines use of statistics in social sciences. Particular focus on use of statistical analysis with surveys and census-type data. Includes parametric and nonparametric statistics utilized most in social analysis. Prerequisite: Stat 1040 or equivalent. (3F,Sp)

DSS 3200. Population and Society. Examination of interrelationships between population change and social structure in national and international context. Examines contributions of fertility, mortality, and migration to population characteristics, particularly sex, age, and ethnic composition. Stresses demographic data and analysis. (3F,Sp)

3320. Sociology of Work and Organization. Stresses contribution of sociology to the understanding of industry as a social system. (3Sp)

3330. Medical Sociology. In-depth analysis of major contributions of sociology to field of medicine. (3F)

3410. Juvenile Delinquency. Focuses on nature, extent, and causes of delinquent behavior. Examines workings of juvenile justice system and programs for delinquency prevention. (3F,Sp)

3420. Criminology. Examines theoretical explanations for crime in the U.S. Describes characteristics of major forms of criminal behavior. (3F,Sp)

3430. Social Deviance. Examination of sociological perspectives on deviance as they apply to lifestyles, commitment, and social control in American society. (3F)

3500. Social Psychology. Explores interaction between the social system and the individual. Examines human behavior in terms of positions people occupy in the social structure. (3F,Sp)

3600. Sociology of Urban Places. Provides historical and international perspective on social, cultural, and spatial characteristics of urban places. Examines changes associated with urbanization processes and the effect of urbanization on community, crime, neighborhoods, and urban space. (3F)

DSS 3610. Rural Sociology. Examines patterns and processes of social change in rural and nonmetropolitan sectors of the U.S. and other advanced industrial societies. Considers how rural social change is influenced by demographic, economic, political, and natural resource conditions at regional, national, and global scales. (3F)

3750. Sociology of Aging. Examination of social context in which aging occurs, the social implications of aging, and attendant social policy issues. Considers both individual and societal aging, using an historical and global approach. (3F)

4010. Contemporary Sociological Theory. Critical analysis of major theorists and schools of theory in sociology from the late nineteenth century through recent and current works. Emphasizes contemporary issues, insights, and uses of sociological theory. (3F)

4330. Sociology of Religion. Discussion of theories and research used by sociologists to understand social dimensions of religion. Includes ways in which religion influences and is influenced by other societal institutions, such as politics, the economy, and the class system. (3F)

CI 4420. Criminal Law and Justice. Sociological analysis of relationship between law and social control and social change, especially regarding law enforcement, courts, and corrections. (3Sp)

DSS 4620. Sociology of the Environment and Natural Resources. Social aspects associated with the environment and natural resources. Topics include: environmental attitudes and perceptions, environmentalism as a social movement, resource scarcity and land use, and social change in resource-based communities. (3Sp)

4710. Asian Studies. Explores history; social, economic, and political institutions; and peoples and cultures of Asian Societies. (3Sp)

4730. Women in International Development. Examines status of women in developing countries, and the role they play in the development process. (3Sp)

4800. Seminar in Sociology. Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology, (h) gerontology. (1-3F,Sp,Su) ®

4900. Independent Readings in Sociology. Independent readings in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology. (1-5F,Sp,Su) ®

DSS 5650 (d6650).[1] Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

6010. Development of Sociological Theory. Examines development of social theory from early to premodern times. Special attention given to nineteenth century European influences on development of American sociological theory. (3F)

6020. Contemporary Sociological Theory. In-depth analysis of selected modern representatives of major theoretical orientations in sociology. Includes relationships between theory and research. (3Sp)

6100. Advanced Methods of Social Research. Examines philosophical bases, techniques, and political and ethical aspects of social research. (3F)

6150. Social Statistics II. Statistical procedures for sociological analysis; nonparametric statistics; inferential statistics, cross-tabulation, and log-linear analysis; correlation; regression; ANOVA; and other multivariable social science statistical treatments. (3Sp)

6200. Social Demography. Focuses on relationships between demographic and sociological processes. Study of theoretical perspectives and empirical analyses of the determinants. Consequences of change in population size, composition, and distribution, as well as changes in demographic processes. (3F)

6230. Techniques of Demographic Analysis. Provides instruction in use of rates, ratios, life tables, and related measures to describe, analyze, and estimate population. Review of measures designed to examine the three demographic processes: fertility, mortality, and migration. Utilization of analytical tools to explore population composition. Special emphasis placed on use of U.S. Census data to create population profiles. (3Sp)

6250. Sociology Internship/Co-op. Professional level of educational work experience in an internship/cooperative education position for graduate students. (1-6F,Sp,Su)

6310. Sociology of Work and Occupations. Uses an applied and comparative cross-cultural perspective to examine work in pre-industrial (agricultural/pastoral), industrializing, industrialized, and post-industrial societies. (3Sp)

6420. Gender and Social Inequality. Contemporary American gender stratification, including (1) What is the problem? (2) Why is it a problem? (3) How does it interact with other stratifiers? (4) What caused or is causing it? (5) How and why is it maintained? and (6) When does it vary and why? Comparison of different views on these issues. (3Sp)

6450. Special Topics in Social Problems. Seminars on various topics appropriate to sociological analysis of contemporary social problems. Subject matter will reflect current faculty research and interests. (3F,Sp) ®

6460. Sociology of Health. Examination of social and cultural factors influencing health. Analysis of health behaviors as consequences of variety of diverse personal and social processes. (3Sp)

6620. Environment, Technology, and Social Change. Focuses on human interactions with the physical environment and changes brought about by this interaction. Topics of major emphasis include: approaches to environmental sociology; environmental values and attitudes; social movements pertaining to environmental concern; and social change responses to technology and resource scarcity. (3Sp)

6630. Natural Resources and Social Development. Focuses on social dimensions of natural resources use, development, scarcity, and allocations. Examines ways in which changing resource conditions impact human social organization. Emphasis on topics including: social characteristics of resource-dependent communities and areas; social organizational responses to changes in availability of, or access to, natural resources; and social impacts of natural resource development activities. (3Sp)

6650 (d5650). Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

6700. Advanced Rural Sociology. Analysis of major developments in the study of rural society and rural communities. Emphasis on rural social changes related to economic, demographic, organizational, and technological trends at societal and global levels. (3F)

6730. Gender and International Development. Examines gender issues in economic and social development. Focuses on theory and methodologies for gender analysis. (3Sp)

6800. Seminar in Sociology. Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) social problems, (h) international development, (i) domestic development, (j) rural sociology, (k) environmental sociology, (l) other. (1-3F,Sp,Su) ®

6900. Independent Readings in Sociology. Independent readings in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology; (e) sociology of development, (f) social problems. (1-3F,Sp,Su) ®

6970. Thesis Research. (1-12F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

7010. Issues in Sociological Theory. Contrasts key contemporary theorists and schools of theory with respect to macro and/or micro approaches to sociological issues and concerns such as social organization, social inequality, and social change. Focal issues vary by instructor. (3F)

7100. Survey and Field Research. Examines and compares procedures for conducting social science research using structured survey questionnaires and qualitative field research/ethnographic methods. (3F)

7110. Advanced Sociological Analysis. Provides review of several quantitative approaches utilized in contemporary social research. Students undertake small-scale analytical exercises in topics including, but not limited to, log-linear and structural equation modeling, logistic regression, and event history analysis. (3Sp)

7250. Advanced Seminar in Social Demography. Detailed comparative and multilevel examination of substantive and methodological issues in the study of nuptiality, fertility, morbidity and mortality, migration, and social mobility. Covers theories, data collection strategies, measurement issues, and analytical techniques. (3Sp)

7400. Social Problems Perspectives. Examines major theoretical and methodological approaches to social problems. (3F)

7620. Sociology of Environmental Hazards and Risks. Focuses on how individuals and organizations respond to environmental hazards and risks resulting from either natural events or human technological and industrial processes. (3Sp)

7640. Population and Environment. In-depth exploration of relationship between human populations and their environment. Heavy emphasis placed on developing an understanding of contemporary research in this area, especially with regard to the association between environmental factors and population organization, change, and growth. (3Sp)

7800. Topical Seminar in Sociology. Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology, (e) sociology of development, (f) social problems. (3F,Sp) ®

7900. Independent Study. Independent study in sociological areas emphasizing (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology, (e) sociology of development, (f) social problems. (1-3F,Sp,Su) ®

7970. Dissertation Research. (1-12F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

Social Work Courses (SW)

1050. Introduction to Social Welfare. Foundation course to facilitate development of an approach to thinking about social welfare. Explores broad common base of social work professional values, knowledge, skills, social policies, and programs. (3F,Sp)

2400. Social Work with Diverse Populations. Examines characteristics of various populations, including patterns, dynamics, and consequences of discrimination, economic deprivation, and oppression. Emphasis placed on empowerment of groups and individuals, as well as the accumulation of multicultural competence. Prerequisite: SW 1050. (3F,Sp)

2500. Human Behavior in the Social Environment. Interrelatedness of social, cultural, and environmental factors that combine with biological and psychological compenents to mold human behavior. Relevance of these factors to generalistic social work practice. Prerequisite: SW 1050. (3F,Sp)

3050. Practice I. Introduction of generalist social work framework as integrative tool, with special attention shown to strengths and empowerment perspective. Individuals as targets for change. Prerequisite: Admission to social work bachelor's program, SW 1050, 2400, 2500. (3F)

3350. Child Welfare. Developments in programs for meeting such needs of children as substitute parental care, adoptions, delinquency problems, mental retardation, and unmarried motherhood. Prerequisites: SW 1050, 2400, 2500. (3Sp)

3360. Adolescents: Theories, Problems, and Issues. Focuses on major social problems confronting youth today: teenage pregnancy, substance abuse, unemployment, education, and mental health. Investigation of theories explaining these problems and society's efforts to resolve these problems. Prerequisites: SW 1050, 2400, 2500. (3F)

3650. Mental Health. Services offered for the prevention and treatment of mental illness and the feasibility of social action programs on a community level. Prerequisites: SW 1050, 2400, 2500. (3Sp)

3750. Medical Social Services. Introduction to role of social worker in health settings. Emphasizes definition of health and disease, patient rights, and consumer participation. Examination of basic health programs, major trends in health planning, and alternate models of health delivery. Prerequisites: SW 1050, 2400, 2500. (3F)

4100. Social Work Research. Survey of qualitative and quantitative scientific methods of research in social work. Articulation of research with practice and policy. Prerequisites: SW 1050, 2400, 2500. (3F)

4150. Practice II. Introduction to generalist social work practice at the micro level. Emphasizes study of skills from a strengths and empowerment perspective with individuals, families, and small groups. Special attention paid to ethical issues and working with diverse population. Prerequisite: SW 3050. (3F,Sp,Su)

4160. Practice III. Introduction to generalist social work practice at the macro level. Emphasizes study of skills from a strengths and empowerment perspective with groups, organizations, and community systems. Special attention paid to ethical issues and working with diverse populations. Prerequisite: SW 4150. (3F,Sp)

4870. Beginning Field Practicum. Practical experience in a social service agency. Seminar integrates field work experiences and academic knowledge. Emphasizes use of self and integration of knowledge, values, skills, and methods of practice, with special emphasis given to the code of ethics. Prerequisite: Instructor's permission and by application. (6F) ®

4900. Topical Issue Seminar. Advanced seminar, designed as a forum for students from varied social science disciplines. Seminars may include issues involved in social work values and ethics, diversity, promotion of social and economic justice, and/or populations-at-risk. Prerequisites: SW 1050, 2400, 2500, and permission of instructor. (3-6F) ®

4950. Directed Readings. Independent readings in various areas of social work: practice, policy, HBSE, research, populations-at-risk, values and ethics, social and economic justice, and diversity. Prerequisite: Instructor's permission and a plan for study. (1-5F,Sp) ®

CI 5350. Social Welfare Policy. Introduction to policy making in social welfare. Principles of social and economic justice used to analyze selected social policies and programs within a historical and contemporary context. Attention given to differential impact on at-risk populations. Prerequisites: SW 1050, 2400, 2500. (3F,Sp)

5870. Advanced Field Practicum. Supervised social work practice and projects. Provides opportunities for advanced social work students to apply classroom learning in a field setting. Minimum of 240 hours in a social service agency required. Prerequisite: Instructor's permission and SW 4870. (6Sp) ®

Anthropology Courses (Anth)

BSS 1010. Cultural Anthropology. Role of cultural concepts within discipline of anthropology. Relationship of cultural concepts to survival and adaptation, society and social life, ideology and symbolism, and cultural change and diversity. Applications to contemporary world problems. (3F,Sp)

BLS 1020. Biological Anthropology. Survey of multidisciplinary field of biological anthropology. Includes study of fossil and living primates, fossil evidence for human evolution, bioarchaeology, contemporary human variation and adaptation, principles of evolutionary theory, and introductory population genetics. (3F,Sp)

CI 1030. World Archaeology. Surveys archaeology and the means by which inferences about the past are made. Examines major processes shaping humans, including world colonization, our foraging legacy, origins of agriculture and civilization, and implications of our past for the present and future. (3F,Sp)

BHU 1710. Introduction to Folklore. Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). (3F,Sp)

2100. Peoples of the Contemporary World. Introduces different ways of life, rural and urban, from the world's major culture areas. Focuses on how contemporary societies have evolved in ecological, historical, and political context. Introduces problems arising from third world social change. (3F)

2720. Survey of American Folklore. Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. (3Sp)

***3110. North American Indian Cultures.** Introduces ethnography of native cultures found within the USA and Canada, documenting their pre-contact adaptations and

their interactions with changing national policies leading to today's resurgence of native peoples. (3Sp)

****CI, DSS 3120. Peoples of the Pacific.** Introduces several perspectives, including: scientific analyses of the settlement and early ecology of the Pacific; impact on Pacific cultures of European contact, especially during the Age of Exploration; ethnographic classic studies of societies such as Trobriands; and briefly, the contemporary scene. Prerequisites: Anth 1010 or permission of instructor. (3Sp)

****CI 3130. Peoples of Latin America.** Survey of Latin American cultures, past and present. Emphasis on culture as a dynamic, adaptive system and on contemporary issues in rural and urban Andean South America, Amazonia, and Mesoamerica. Appropriate for both majors and nonmajors. (3F)

DSS 3160. Anthropology of Religion. Cross-cultural description and theoretical analysis of religion and its functional relationships to human psychology, society, and the natural environment. (3Sp)

DSS, CI 3170. Symbol Systems and the Origins of Writing and Literacy. Discusses four broad themes: (1) humans as symbol-makers; (2) the development of writing systems; (3) the decipherment of ancient scripts; and (4) social construction of literacy. Specific topics include: cave art and myth, decipherment of Egyptian and Mayan hieroglyphics, and the place of literacy in society. Prerequisites: Any one of USU 1320, Anth 1030, Anth 3350, Hist 1040, Hist 3110, or permission of instructor. (3F)

****DSS, CI 3180. Ecology in Anthropology.** Details how relationships between cultural form and environmental structure and variation have been examined in anthropology. In-depth study of main perspectives, including cultural ecology, cultural materialism, and contemporary evolutionary ecology. Explores relevance for current and future human-environment issues. (3Sp)

DSS, CI 3200. Perspectives on Race. Study of the processes of racial differentiation, the basis of biological differences found among existing races, the influence of biology and culture on racial variation, and the influence of social context on perceptions of race. (3Sp)

3250. Osteology. Detailed hands-on study of human skeleton, including component of comparative vertebrate skeletal anatomy. Applications to fields of archaeology, forensic science, paleopathology, and zoology. Includes methods component. (3F)

****DSS 3300. Archaeology in North America.** Prehistoric and historic archaeology of the North American continent. Explores initial colonization and Native American origins; variability among foraging adaptations; spread of farming; cultural complexity in Midwest, Southwest, and West Coast; Indian-environment relationships; European contact; depopulation; and historic archaeology of Euro-Americans. (3Sp)

***DSS 3350. Archaeology of Ancient Civilizations.** Surveys primary states in antiquity, including Mesopotamia, China, Egypt, South America, and Mesoamerica. In-depth study of the process of their formation and theories of their origins. Emphasis is anthropological and scientific to complement the classical and humanistic. (3Sp)

3400. The Study of Language. Investigates ways in which human languages are structured, how they change, how they reflect the cultures in which they are used, and how they are learned. (3F,Sp)

3990. History and Theories of Anthropology. Traces history of anthropology, main currents of theoretical thought shaping claimed anthropological knowledge, and major figures associated with the discipline. Conceptualizes anthropology among the social sciences, life sciences, and humanities. Prerequisite: Anth 1010. (3F)

****DSS 4110 (d6110). Southwest Indian Cultures, Past and Present.** Reviews past and present Indian cultures of greater southwest region. Examines the prehistoric Anasazi, the Pueblos, the canyon and desert peoples, the Utes, and the Navajos. Interprets these cultures in ecological, historic, and political contexts. (3Sp)

***CI 4120. Ethnography of Childhood.** Focuses on ethnographic methods and the anthropological study of childhood. Students design and carry out ethnographic study of children in school, family, or other setting. Readings of ethnograpic studies of childhood from the U.S. and abroad. Includes methods component. (3F)

***DSS 4130. Medical Anthropology.** Examines ecological, behavioral, and ideational aspects of disease and illness in human populations, as well as adaptive responses used cross-culturally by groups to restore health. Appropriate for both majors and nonmajors. Includes methods component. (3F)

****DSS 4200. Paleoanthropology.** Surveys multi-disciplinary field of paleoanthropology. Detailed analysis of fossil evidence for human evolution, including consideration of materials and methods used to date and interpret ancient hominid remains. Prerequisite: Anth 1020 or permission of instructor. (3Sp)

***4250. Problems in Bioarchaeology.** Application of techniques in human osteology, emphasizing study of diet, disease, injuries, and activity patterns through the quantitative analysis of skeletal data from archaeological samples. Includes methods component. Prerequisite: Anth 3250 or permission of instructor. (3Sp)

***4350. Archaeological Method/Theory and Cultural Resource Management.** Examines contemporary theories, as well as methods used by archaeologists to address questions arising from theory. Also considers contributions of cultural resource management to meeting anthropological and public concerns. Includes methods component. (3Sp)

***DSS 4360. Ancient Desert West.** Prehistoric to historic human ecology and paleoenvironments of the Great Basin, Southwest, and southern California deserts. Emphasizes perspective of human evolutionary ecology and detailed examination of the archaeological record in conjunction with paleoenvironmental data. For classroom work only, 3 credits are granted. For 4 credits, one or more weekend field trips are required. Prerequisite: Anth 1030 or permission of instructor. (3-4F)

4800. Topics in Anthropology. Focuses on special topics in anthropology. Topics and course format vary. (1-3) ®

DSS 5100 (d6100). Anthropology of Sex and Gender. Increases awareness of sexuality and gender, and of feminist perspectives about social problems related to gender and sexuality that cross-cut cultural boundaries. Emphasizes gender-related social problems in contemporary world societies. (3F)

****5120 (d6120). Applied Rural Development.** Reviews development anthropology for practitioners. Examines human dimensions of planned policy, program, and project interventions. Examines how rural development occurs and how it is analyzed and managed in selected real-world cases. Includes methods component. (3Sp)

****5140 (d6140). Shamanism and Traditional Medicine.** Senior/graduate-level course, studying shamanism in cross-cultural context. Compares and contrasts shamanism with “New Age” healing and ethical dimensions of research and practice. Recommended: Anth 4130. (3F)

***DSS 5160 (d6160). Cities and Development.** Examines role of emergent urban areas in national development. Employs ethnographic case studies of selected cities, coupled with a policy perspective on problems of hyperurbanization in both poor and more advanced societies. Includes methods component. (3F)

5190. Applied Anthropology Practicum. Supervised projects in applied anthropology for advanced students. Integrates academic knowledge and field technique. Minimum contact hours, requirements, and credits available vary. Includes methods component. Prerequisite: Application and instructor approval. (1-5) ®

5300. Archaeology Field School. Internship on archaeological field project, including survey, excavation, recording, mapping, and scientific conduct of archaeological problem solving. Application process begins in March. Additional field support fee required. Prerequisites: Anth 1030 and instructor's permission. (1-5Su) ®

5310. Archaeology/Physical Anthropology Lab. Laboratory experiences enabling

participation in analysis/reporting stages of archaeological or physical anthropology project. Includes methods component. Prerequisite: Permission of instructor. (1-3F,Sp) ®

5650 (d6650). Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

5700. Folk Narrative. Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. (3)

5800. Museum Development. Apprenticeship in the USU Museum of Anthropology to learn the operation of a small museum, including artifact curation and exhibit development. Written proposal of planned work is required prior to the semester that this course is taken (consult with instructor). Prerequisites: Instructor's permission and minimum of three anthropology courses. (1-3F,Sp) ®

5900. Independent Studies. Customized study or readings for upper-division or graduate students on topics not covered in regular courses. Prerequisite: Approval, prior to registration, of proposal written by student in consultation with instructor. (1-3F,Sp) ®

5980. Senior Project. Develops advanced research and writing skills in a specialty area, and results in a research project/report. Must register in combination with a 4000- or 5000-level anthropology course, in consultation with instructor and subject to approval. (1F,Sp)

5990 (d6990). Contemporary Anthropological Theory and Method. Capstone course in anthropological theory and method, required for all majors. Prerequisite for majors: Anth 3990. Graduate students may enroll only at instructor's discretion, and must enroll for extra weekly meeting. (3Sp)

6100 (d5100). Anthropology of Sex and Gender. Increases awareness of sexuality and gender, and of feminist perspectives about social problems related to gender and sexuality that cross-cut cultural boundaries. Emphasizes gender-related social problems in contemporary world societies. (3F)

****6110 (d4110). Southwest Indian Cultures, Past and Present.** Reviews past and present Indian cultures of greater southwest region. Examines the prehistoric Anasazi, the Pueblos, the canyon and desert peoples, the Utes, and the Navajos. Interprets these cultures in ecological, historic, and political contexts. (3Sp)

****6120 (d5120). Applied Rural Development.** Reviews development anthropology for practitioners. Examines human dimensions of planned policy, program, and project interventions. Examines how rural development occurs and how it is analyzed and managed in selected real-world cases. Includes methods component. (3Sp)

****6140 (d5140). Shamanism and Traditional Medicine.** Senior/graduate-level course, studying shamanism in cross-cultural context. Compares and contrasts shamanism with "New Age" healing and ethical dimensions of research and practice. Recommended: Anth 4130. (3F)

***6160 (d5160). Cities and Development.** Examines role of emergent urban areas in national development. Employs ethnographic case studies of selected cities, coupled with a policy perspective on problems of hyperurbanization in both poor and more advanced societies. Includes methods component. (3F)

6650 (d5650). Developing Societies. Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. (3F)

6900. Independent Studies. Customized study or readings for graduate students on topics not covered in regular courses. Prerequisite: Approval of proposal written by student in consultation with instructor. (1-3F,Sp) ®

6990 (d5990). Contemporary Anthropological Theory and Method. Capstone course in anthropological theory and method, required for all majors. Prerequisite for majors: Anth 3990. Graduate students may enroll only at instructor's discretion, and must enroll for extra weekly meeting. (3Sp)

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Department of
Special Education and Rehabilitation

College of Education

Head: Professor *Charles L. Salzberg,* applied behavioral analysis, single-subject research design, research on teacher training, employment preparation for persons with disabilities, video assisted training programs, paraeducator training, and students with disabilities in higher education
Office in Emma Eccles Jones Education 313A, (435) 797-3243

Undergraduate Program Coordinator: Associate Professor *Benjamin Lignugaris/Kraft*, secondary special education, social/vocational skill training, behavioral analysis, instructional design and program development
E-mail: lig@cc.usu.edu

Advising and Student Teaching Coordinator: *Darcie L. Peterson*
E-mail: darciep@cc.usu.edu

Graduate Program Coordinators:
Professor *K. Richard Young*, behavior analysis in education, treatment of antisocial behavior, education of students with behavioral disorders, severe disabilities, and at-risk individuals
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Associate Professor *Pamela J. Hudson*, adolescents with mild disabilities
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Associate Professor *Timothy A. Slocum*, reading, mild/moderate disabilities, behavior analysis
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Rehabilitation Counseling Program Coordinator: Professor *Garth M. Eldredge*, rehabilitation counseling
E-mail: garthe@coe.usu.edu

Consortium in Sensory Impairments Coordinator: Professor *Martin Agran*, education of students with severe disabilities, transition, self-determination
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Professors *Marvin G. Fifield*, evaluation of persons with emotional disturbances; *Alan M. Hofmeister*, technology; *Sarah Rule*, early intervention, mainstreaming at the elementary level, technology and teacher education, adult services; *Richard P. West*, behavior analysis in education, computer-based decision making, parent training, school organization and administration; *Karl R. White*, research and evaluation, early intervention; **Professor Emeritus** *Glenn I. Latham*, persons with mental retardation, parent training, teacher effectiveness; **Associate Professors** *Daniel P. Morgan*, behavioral disorders; *Julie F. Smart*, rehabilitation counseling; **Associate Professors Emeritus** *Hyrum S. Henderson*, teacher training; *Devoe C. Rickert*, vocational training; **Assistant Professors** *Hal M. Cain*, rehabilitation counseling; *Stephanie Peck*, early childhood, education of students with severe disabilities; **Clinical Instructors** *Barbara J. Fiechtl*, preschool and infant service delivery; **Adjunct Clinical Instructor** *Patricia B. Willis*, learning disabilities; **Clinical Instructor Emeritus** *Joan F. Forsgren-White*

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Education (MEd), Educational Specialist (EdS), and Doctor of Philosophy (PhD) in Special Education; MS in Special Education, with specialization in Rehabilitation Counseling; the Special Education and Rehabilitation Department participates in the Interdepartmental Doctor of Education (EdD)

Undergraduate emphases: *BS, BA*–Mild/Moderate Disabilities, Severe Disabilities, Early Childhood Special Education; **Graduate specializations:** *MEd, MS, EdS, PhD*–Behavioral Disorders, Early Childhood Special Education, Mild/Moderate Disabilities, Rehabilitation Counseling (MS only), Severe Disabilities, Transition/Special Education. **Certification** is available for teachers in early childhood special education, mild/moderate disabilities, and severe disabilities. At the postbachelor's level, certification is available for teachers in vision and hearing impairments. Special Education dual certification programs are available with the departments of Secondary Education, Elementary Education, and Family and Human Development.

Undergraduate Programs

Objectives

The undergraduate programs in the Department of Special Education and Rehabilitation offer educational and training opportunities for teachers and support personnel working with exceptional children and adults with disabilities. The programs prepare students to work with individuals with mild, moderate, and severe disabilities and with early childhood special education. Students who are majoring in other teaching fields (i.e., elementary education, secondary education) are encouraged to pursue a second endorsement by taking those courses which lead to a special education credential. Teacher education programs in the department are accredited by the State of Utah and nationally by NCATE.

Areas of Emphasis. The Department of Special Education and Rehabilitation offers training programs for individuals who want to work with children and adults with disabilities. A student fulfilling the undergraduate course requirements will qualify for a BS degree in special education and be eligible for an endorsement to teach students with mild/moderate disabilities, students with severe disabilities, or young children with disabilities. The severe and mild/moderate endorsements allow graduates to teach pupils with disabilities from kindergarten through 12th grade. In addition, the department offers dual teaching majors with the departments of Secondary Education, Elementary Education, and Family and Human Development. Students completing the dual major requirements in secondary education will be eligible for teacher certification in one of the special education endorsement areas and their secondary education content major. Students completing the dual major requirements in elementary education will be eligible for teacher certification in one of the special education endorsement areas and elementary education. Students interested in teaching preschool children with disabilities may receive an early childhood special education certificate for ages 0-5, in addition to a K-12 special education endorsement.

Requirements

Admission Requirements. Students are admitted to the Department of Special Education and Rehabilitation as Pre-Special Education majors by meeting the Utah State University minimum requirements (see pages 43-46). To become a Special Education major, a student must make written application to the department after meeting the following prerequisites: (1) completion of at least 30 semester credits with a cumulative GPA of 2.75 or higher; and (2) completion of admission requirements to the College of Education Teacher Education Program (see page 73). Students should apply to the department during fall semester of their sophomore year. Admission to the department is competitive based on several factors. These include: (1) the student's current GPA; (2) the number of credit hours completed by the end of fall semester; (3) completion of premajor classes (such as Stat 1040 and FHD 1500); and (4) the student's career goals and experiences.

GPA Requirement. A minimum GPA of 2.75 is required to apply for admission, to remain in good standing, and to graduate from the program. All required special education classes must be completed with a grade of *C* or better.

Bachelor of Science in Special Education. Undergraduate study leads to the Bachelor of Science degree in Special Education with certification to teach students with mild/moderate disabilities, severe disabilities, or early childhood special education. The degree requires a total of **120 credits**. The requirements are as follows:

1. University Studies Requirements. Competency Requirements (9 credits), Breadth Requirements (15 credits), and Depth Requirement (6 credits).

2. Professional Education. 13-17 credits.

3. Special Education Major. 42-60 credits. Coursework includes: human growth and development; applied behavior analysis; introduction to systematic instruction (task analysis, curriculum-based measurement, behavioral objectives, contingent reinforcement); designing curriculum; Individualized Educational Programs (IEP); educational assessment, analysis, and adaptation of instructional materials; intervention strategies for academic and social behaviors; and parent involvement. Additionally, each endorsement area includes practicum work with exceptional children or youth. Finally, all students must complete student teaching with students with disabilities.

4. Professional Depth. 15 credits. The emphasis area is designed to enhance the Special Education major's background. Areas recommended include communicative disorders, psychology, sociology, family and human development, recreation, and physical education.

5. Electives. 7-20 credits.

Additional Information

For more information concerning Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheets available from the Department of Special Education and Rehabilitation (Education 313) or the Special Education Advising Office (Education 107).

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, there are some endowed scholarships available through the department and, sometimes, there are stipends available from federal grants.

Graduate Programs

Admission Requirements

See general admission requirements, pages 60-61. In addition, admission committees consider experience, undergraduate record and curriculum, and formal recommendations. A student applying for admission to a special education graduate program without an undergraduate special education background may be required to complete selected undergraduate courses prior to admission as a fully matriculated graduate student.

Admission to all graduate courses in Special Education and Rehabilitation is contingent upon admission to the School of Graduate Studies and completion of approved undergraduate prerequisites.

Students must have scores on the verbal and quantitative portions of the Graduate Record Examination (GRE) at or above the 40th percentile. TOEFL scores are required for candidates from abroad with a minimum of 550 deemed acceptable. International students with a prior degree from an English-speaking university are exempted from the TOEFL exam. Students admitted with a TOEFL score of less than 550 will be required to take the Intensive English Placement Examination upon arrival. Performance on that examination will determine the amount of Intensive English the student will need. For consideration for admission to the master's degree program, applicants may submit either GRE or Miller Analogies Test scores.

Applicants are screened throughout the year by the Graduate Program Executive Committee. No applications will be considered until all required information arrives in the School of Graduate Studies or a formal petition is made and approved.

Teaching Certificates

The department prepares students for certification as teachers of students with mild/moderate disabilities, students with severe disabilities, and preschool-age students with disabilities. Certification may also be obtained in visual and/or hearing impairments through a multi-university consortium program. Certification may be obtained as part of the graduate degree program or without a graduate degree.

Degree Programs

Master of Science in Special Education (MS). The department offers programs leading to the MS. A minimum of 36 credits, including a thesis, is required for the MS degree. Students may choose to apply for certification after completing the required coursework but before completion of the degree program.

Master of Education in Special Education (MEd). The department offers programs leading to the MEd. A minimum of 36 credits, including a creative project, is required for the MEd degree.

Master of Science in Special Education, Rehabilitation Counseling Specialization (MS). The Master of Science degree in Special Education with specialization in Rehabilitation Counseling prepares persons with the basic competencies to provide rehabilitation counseling to a broad range of individuals with disabilities in a variety of settings, such as state rehabilitation agencies, independent living centers, rehabilitation hospitals, private rehabilitation facilities and agencies, employment assistance programs, and private industry. The degree

specialization is a 48-credit program consistent with the requirements of the Council on Rehabilitation Education (CORE). The Rehabilitation Counseling Program has a limited number of scholarships funded through the U.S. Department of Education, Rehabilitation Services Administration. These scholarships require a postgraduate commitment to work for a not-for-profit agency serving the needs of individuals with disabilities for two years for every year of scholarship received.

Educational Specialist Program (EdS). The educational specialist degree is designed for advanced graduate students seeking instruction beyond a master's degree. Programs are planned to address specific student needs and will involve both master's and doctoral courses. Completion of the EdS program will be based on completion of required coursework, submission of a research proposal to a supervisory committee, and satisfactory defense of the research project.

Doctor of Philosophy Program (PhD). The general purpose of the PhD program is to prepare leadership personnel for positions in research and university programs.

Completion of the PhD program certifies competence in the three following areas: (1) mastery of the theoretical and applied content required for providing appropriate education for persons with disabilities (infants and toddlers, children, youth, and/or adults), (2) ability to conduct independent research with particular emphasis on those research techniques in behavioral analysis, and (3) ability to effectively teach audiences of varying sophistication and expertise and to supervise the delivery of special education or rehabilitation services.

Doctorate of Education (EdD). The department participates in the Interdepartmental Doctorate of Education (EdD) degree program. The general purpose of the special education emphasis area of the EdD program is to prepare leadership personnel for positions in administration, supervision, curriculum development, and teacher training. For information about areas of specialization, emphases of study, research sponsored, admission requirements, procedures to follow, and other information, see pages 177-178 of this catalog.

Financial Assistance

Acceptance of a student to a graduate program is independent of financial aid. Financial assistance available through the School of Graduate Studies includes University fellowships, scholarships, and fee waivers. Further, federal grants to the faculty members often provide stipends and assistantships for doctoral students.

Additional Information

Graduate handbooks outlining the graduate programs, policies, and procedures in the Department of Special Education and Rehabilitation may be obtained from the department office in room 313 of the Education Building.

For more information about graduate requirements and the sequence in which courses should be taken, see major requirement sheets, available from the department.

Graduation requirements described in this catalog are subject to change. Students should check with the department concerning possible changes.

Because the Special Education and Rehabilitation graduate programs occasionally undergo fine-tuning and updating, prospective students are advised to check the departmental web page at:

http://www.sped1.ed.usu.edu, or e-mail susann@coe.usu.edu.

Special Education Courses (SpEd)

1010. Disability in the American Experience. Discussion of definitions and types of disabilities, ethical issues, society's prejudice and discrimination against people with disabilities, and the individual's adjustment to the disability experience. Disability as a natural part of life. (3)

2150. Introductory Experience with Students with Disabilities. Introductory seminar and practicum from which students learn basic instructional techniques from videodisc simulations, then apply them in public schools. (1-4F,Sp,Su) ®

3030. Educational and Multicultural Foundations. Explores historical and cultural aspects of schooling and the inclusion of students with disabilities and bilingual students in general education classrooms. Examines how schooling practices change from elementary to high school and commonalities that bind the teaching profession. (3Sp)

4000. Education of Exceptional Individuals. Characteristics of all types of exceptional children with emphasis on the educational and psychological implications of these conditions to the development of the child. (2F,Sp,Su)

4910. Undergraduate Research and Creative Opportunities. Individually directed study at the undergraduate level. Permission of instructor required. (1-4F,Sp,Su) ®

4970H. Honors Thesis. Provides an opportunity for honors students in the Department of Special Education and Rehabilitation to interact with other honors students in the College of Education and explore an interdisciplinary area of interest. A written paper will be required. (1-6F,Sp,Su) ®

QI 5010. Applied Behavioral Analysis 1: Principles, Assessment, and Analysis. Methods of collecting data, using data to make decisions, analyzing data, graphing data, and applying principles of behavior management and instruction to children and youth. Prerequisite: Admission to special education major or permission of instructor. (3F)

5040. Foundations of Effective Assessment and Instructional Practices. Principles of standardized and curriculum-based assessment. Foundations for designing effective instructional programs to help students achieve mastery and proficiency. Prerequisite: Admission to special education major or permission of instructor. (3F)

5050. Applied Behavioral Analysis 2: Applications. Expands knowledge of basic applied behavior analysis principles. Develops skills for remediating behavior problems while teaching social skills. Prerequisite: Admission to special education major or permission of instructor. (3Sp)

5060. Consulting with Parents and Teachers. Provides strategies for communicating with parents and teachers, as members of a multidisciplinary team, to assist parents and other teachers in collaborative problem solving. Prerequisite: Admission to special education major or permission of instructor. (3Sp)

5070. Policies and Procedures in Special Education. Provides an understanding of federal and state laws for persons with disabilities and procedures for organizing a special education classroom and auxiliary staff. Prerequisite: Admission to special education major or permission of instructor. (3F)

CI 5200. Student Teaching in Special Education. Prerequisite: Admission to special education major or permission of instructor. (3-15F,Sp,Su)

CI 5210. Student Teaching in Special Education: Dual Majors. Undergraduate student teaching for dual majors. (3-15F,Sp,Su)

5220. Special Education Student Teaching Seminar. Weekly seminar taken

concurrently with student teaching (SpEd 5200 or 5210). Focuses on problems arising during student teaching and the development of a teaching portfolio. Prerequisites: Admission to teacher education and completion of the SpEd sequence. (3F,Sp,Su)

5310. Teaching Reading, Language Arts, and Math to Students with Mild/Moderate Disabilities. Curriculum, instructional methods, assessment, and data-based decision making related to teaching reading, language arts, and mathematics to students with mild/moderate disabilities. (4F)

5320. Teaching Content Areas and Transition to Students with Mild/Moderate Disabilities. Students learn to teach content area material, learning strategies, and transition-related skills to students with mild/moderate disabilities. Also includes assessment and decision making strategies related to these curricular areas. (5Sp)

5330. Eligibility Assessment for Students with Mild/Moderate Disabilities. Choosing and administering eligibility assessment tests for students who may have mild/moderate disabilities. Interpretation of test results and applying results to decisions regarding students' eligibility for special education services. (1)

5410. Practicum: Direct Instruction Reading and Language Arts for Students with Mild/Moderate Disabilities. Students learn to use Direct Instruction techniques, positive management, curriculum-based assessment, and data-based decision-making to teach reading and language arts to children with mild/moderate disabilities. Students placed in a classroom, where they teach a group of children daily. (2F)

5420. Practicum: Teaching Mathematics, Content Areas, and Transition for Students with Mild/Moderate Disabilities. Use of effective instructional techniques, positive management, curriculum-based assessment, and data-based decision making to teach academic content, learning strategies, and transition topics to children with mild/moderate disabilities. Students placed in a classroom, where they teach one or more groups of children daily. (4Sp)

5510. Curriculum for Students with Severe Disabilities. Provides information about commercially available curricular materials, as well as how to plan for and design curricula, for persons with severe disabilities. (2F)

5520. Curriculum for Secondary-Level Students with Severe Disabilities. Provides information on developing and implementing secondary-level classroom, community, and transition instructional programs. (2F)

5530. Assistive and Adaptive Technology for Persons with Disabilities. Trains students to assess needs for augmentative/alternative communication devices, and to select, program for, maintain, repair, and build adaptive devices. (2Sp)

5540. Issues in Educating Persons with Severe Disabilities. A seminar to discuss current topics and research trends affecting persons with severe disabilities. (1Sp,Su)

5560. Practicum in Improving School System Programs. Seminar focused upon a different phase of the instruction program, a sequence of developmental training programs, and new and persisting problems in many dimensions of teaching. Permission of instructor required. (1-4F,Sp,Su) ®

5600. Practicum: Introduction to Instruction of Students with Severe Disabilities. A field-based class providing experience in observing and teaching students with severe disabilities. Prerequisite: Permission of instructor. (3F)

5610. Practicum: Advanced Systematic Instruction of Students with Severe Disabilities. Provides opportunity to assess a need, design a program and objectives, and revise the instruction to teach another to implement it. Prerequisite: Permission of instructor. (3Sp)

5710. Young Children with Disabilities: Characteristics and Services. Provides information about young children with disabilities, including historical development of services, skill areas, family involvement, teaming, and the array of service environments. (3Sp)

5720. Behavior Analysis Practicum. Students receive supervised training in applying behavior analysis principles in community, school, and institutional settings. Either SpEd 5050 or Psy/SpEd 5720 fulfill part of practicum requirement for Behavior Analysis track. Prerequisite: Permission of instructor. (3F)

5730 (d6260).[1] Intervention Strategies for Young Children with Disabilities. Provides information on curricula, instructional strategies, service environments, and staffing roles for teachers of young children (0-5) with disabilities. (3F)

5790. Special Topics. (1-4F,Sp,Su) ®

5810. Seminar and Field Experiences with Infants and Families. Participation with an infant and family in both the home and early intervention setting. Seminar topics include infant medical issues, health, safety, syndromes, and low incidence characteristics. (4Sp)

5820. Preschool Practicum with Young Children with Disabilities in Community Environments. Students participate in variety of environments serving preschoolers with disabilities, assist in developing a family service plan, and teach other staff to implement techniques. (4F)

5830. Seminar Working with Peers on Multidisciplinary Teams. Seminar for discussion of topics pertaining to how teams work with children, with and without disabilities, in a practicum. Students assigned to a team for planning and problem solving throughout the semester. Also taught as FHD 5830. (1F,Sp)

5900. Independent Study. Permission of instructor required. (1-3F,Sp,Su) ®

5910. Independent Research. Permission of instructor required. (1-3F,Sp,Su) ®

6010. Interventions for Parents and Families. Explores special challenges faced by parents and families of at-risk students and students with disabilities. Emphasizes intervention strategies, supportive resources, and parent programs. (2)

6020. Design and Evaluation of Instruction. Presents curriculum in which diagnosis and instruction are welded as a unit into the regular teaching procedures. (3Sp)

6030. Clinical Practicum: Student Teaching. Supervised practicum in a clinical teaching setting. Prerequisite: Permission of instructor. (2-12F,Sp,Su)

6040. Functional and Augmentative Communication Approaches and Technology. Theory and methods of symbolic and nonsymbolic communication acquisition, especially for students with dual sensory impairments. Application of instruction and systems within natural routines. (3F)

6050. Issues with the Delivery of Services for Students with Dual Sensory Impairments. In-depth presentation of best practices for educational services for students with dual sensory impairments. (2F)

6060. Legal Issues in Special Education. Provides knowledge of a wide range of legal issues concerning the provision of special education services to students with disabilities. (3Sp)

6070. Infusing Mobility and Communication for Students with Dual Sensory Impairments. Reviews methods for providing orientation and mobility training to students with dual sensory impairments. Provides methods for infusing these and communication objectives into normal age-based routine activities. (2Sp)

6080. Collaboration and Management of Services for Students with Dual Sensory Impairments. Reviews methods of planning and coordination of services for students with dual sensory impairments (e.g., transition, lifestyle planning, transition team coordination). Service management addressing issues of scheduling, monitoring, and training of staff and peers. (2Sp)

6090. Curriculum and Environmental Variations and Management. Presents

instructional and curricular strategies to promote utilization of residual vision or hearing skills. Overviews tactile cuing and movement-based approaches, with emphasis on integration within natural context and functional activities. Review of model delivery methods. (2Sp)

6100. Introduction to the Education of Students with Visual Impairments. Explores theory and practice within the field of visual impairments, including historical and philosophical influences, methodologies, issues, and trends. Identifies support agencies, resources, and service providers available for visually impaired individuals and their families. Examines roles of various professionals within the field and available delivery models. (2F)

6110. Social and Psychological Implications of Visual Impairment. Explores attitudes and beliefs related to visual impairment and blindness. Emphasizes impact of vision loss on the psychosocial functioning of individuals and their families. Studies self-concept, self-esteem, and strategies to enhance these areas in visually impaired children. (2Su)

6120. Ocular Disorders and Examinations Techniques/Utilization of Low Vision. Students demonstrate the ability to identify the important parts of the visual system, to understand and interpret eye reports, and to translate the information into an educational plan. Participants also conduct and supervise vision screening clinics. In addition, participants demonstrate a basic understanding of approaches and practices of low-vision services. Includes low-vision aids, optics, and environmental modifications. (4)

6130. Literary Braille Codes and Braille Technologies. Focuses on reading and writing literary braille. Includes literary braille contractions, short-form words, punctuation, and rules of usage for basic Grade 2 braille, using the Perkins Braille Writer. Emphasizes accuracy, beginning formatting, and ability to apply the rules. Using a slate and stylus, as well as computerized braille writers, students learn to write literary braille. (4F)

6140. Nemeth Braille Codes and Braille Technologies. Transcription of print mathematical symbols into appropriate formats, using Nemeth Braille Code of Mathematics. Computation skills using adapted abacus for basic mathematical operation. Explores braille music, foreign language braille, computer braille, and Grade 3 braille. Emphasizes literary braille in more extended writing projects. (2Sp)

6150. Teaching Learners with Sensory Impairments and Multiple Disabilities. Provides basic understanding of the needs of learners (ages 0-22) having sensory impairments with multiple disabilities. Includes role and characteristics of the transdisciplinary team, learning environments, resources, assessment procedures, and instructional strategies. Identifies inclusion procedures, transitional issues, and methods of encouraging parental involvement. (3Su)

6160. Introduction to Orientation and Mobility. Introduces students to orientation and mobility, as well as basic assessment techniques. Students learn to use the results of these assessments, along with specific teaching techniques in pre-cane orientation and mobility skills, in teaching children with visual impairments. Students also become familiar with basic indoor (non-cane) mobility techniques, learn to identify and teach orientation cues in the environments, and develop lesson plans to teach concepts necessary for future cane travel. (2Su)

6170. Instructional Management for Students with Visual Impairments (0-21). Emphasizes best practices for instructional management of children with visual impairments in early intervention settings, preschool programs, and early elementary grades. Also addresses practices for older students in upper elementary through high school grades. Explores strategies for development of basic concepts, socialization skills, emergent literacy, effective braille reading and writing, daily living skills, career understanding, and recreational and leisure skills. Focuses on understanding agency and community resources, family collaboration, modification and adaptation of materials and environments, and adapted technology. (4F)

6180. Field Studies in Visual Impairments. Participants work with visually impaired students in a variety of educational sites. Emphasizes use of adapted technology, implementation of teaching activities, student assessment, and modification of educational materials. (2F)

6190. Advanced Support Specialists Training for Early Childhood Sensory Impairments. Prepares personnel for service to young children with sensory impairments and their families. Students synthesize informtion received through previous specialization coursework in Special Education Early Childhood, Visual Impairments. Emphasis on provision of intervention and support in a collaborative, culturally sensitive, family-centered manner. Families of children with sensory impairments participate as co-instructors. (2Su)

6220. Characteristics of Children with Emotional and Behavioral Disorders. Explores characteristics of children and youth with emotional and behavioral disorders. Covers definitions, prevalence and incidence, classification, causal factors, and facets of disordered behavior. (3)

6230. Education of Students with Emotional and Behavioral Disorders. Methods of teaching students with emotional and behavioral disorders, including educational strategies and behavioral treatments. (2)

6260 (d5730). Intervention Strategies for Young Children with Disabilities. Provides information on curricula, instructional strategies, service environments, and staffing roles for teachers of young children (0-5) with disabilities. (3F)

6290. Teaching Social Skills, Self-Management, and Values. Discussion of current research and practices related to teaching social skills, self-management, and values. Explores teaching procedures and curriculum programs. (3sp)

6300. Collaboration Skills for Classroom Teachers. Emphasizes knowledge, attitudes, and skills which special educators must possess to effectively collaborate with parents and professionals. (3F)

6320. Seminars in Learning Characteristics of Students with Dual Sensory Impairments. Investigates characteristics of dual sensory impairment, learning styles, and environmental demands. Awareness of eye and ear anatomy. Interpretation of formal assessments. Development of instructional strategies. (2Su)

6410. Field Studies I: Analysis of Service for Students with Dual Sensory Impairments. First of three field experiences for students in the DSI program. Emphasizes team-based review and analysis of services. (2F)

6420. Field Studies II: Analysis of Service for Students with Dual Sensory Impairments. Practicum in integrated programs for students with dual sensory impairments within the context of the model classroom. Emphasizes transdisciplinary methods for assessment, instructional design, and planning skills. (2)

6430. Field Studies III: Analysis of Service for Students with Dual Sensory Impairments. Advanced practicum in integrated programs for students with dual sensory impairments. Emphasizes an overall management of instructional environment and services. (2)

6500. Interdisciplinary Workshop. Series of self-instructional modules and videos and a variety of elective training. Module topics include developmental disabilities, legal aspects and issues, assessment, intervention, assistive technology, transition, and prevention/intervention for aggression and violence. (1-2F,Sp,Su) ®

6550. Practicum in the Evaluation of Instruction. Field-based research course contributing toward graduate degrees and supervisory certification related to the assessment of an ongoing or newly proposed program of instruction. (1-4F,Sp,Su) ®

6560. Improvement of Instruction. Focuses on effective teaching methodologies, teaching performance, and curriculum decision making. (1-4F,Sp,Su) ®

6700 (d7700). Single-Subject Research Methods and Designs. Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. (3F,Su)

6720 (d7720). Advanced Behavior Analysis in Education. Discussion of advanced topics and issues in behavior analysis, including rule-governed behavior, stimulus control, setting events, functional analysis, and verbal behavior. Topics integrated into educational practice. Prerequisite: SpEd 5050 or equivalent. (3F)

6810. Seminar in Special Education. (1-3F,Sp,Su) ®

6900. Independent Study. Prerequisite: Permission of instructor. (1-2F,Sp,Su) ®

6910. Independent Research. Prerequisite: Permission of instructor. (1-2F,Sp,Su) ®

6930. Internship in Special Education. Professional and supervised intern experience for master's program. Prerequisite: Permission of instructor. (2-10F,Sp,Su)

6960. Creative Project. Culminating experience of MEd program. Prerequisite: Proposal approval by supervisory committee. (1-6F,Sp,Su) ®

6970. Thesis. Culminating experience of MS program. Prerequisite: Proposal approval by supervisory committee. (1-9F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-8F,Sp,Su) ®

7050. Internship in Program Evaluation. Experience in evaluation activities of educational and behavioral programs in public and private schools, treatment centers, homes, and communities. Prerequisites: Approval of supervisory committee and permission of instructor. (1-5F,Sp,Su) ®

7060. Research Internship. Experience in conducting research through planned, supervised research project approved by the student's supervisory committee. Prerequisite: Permission of instructor. (1-5F,Sp,Su) ®

7070. Grant Writing. Preparation of grant proposals under faculty supervision. Permission of instructor required. (1-3F,Sp,Su) ®

7330. Supervision Internship. Experience in supervising undergraduate and master's students during practica, student teaching, and other field experiences. (1-5F,Sp,Su) ®

7340. College Teaching Internship. Under faculty supervision, students experience teaching a university course. (1-3F,Sp,Su) ®

7500. Interdisciplinary Workshop. Workshop on current interdisciplinary issues and topics in special education and related fields. (1-3F,Sp,Su) ®

7700 (d6700). Single-Subject Research Methods and Designs. Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. (3F,Su)

7710. Advanced Single-Subject Research Methods and Design. Explores advanced concepts and procedures for within-subject research methodology. Builds on knowledge and skills acquired in SpEd 6810 regarding scientific questions, measures, research designs, data analysis, and inference. Students analyze research and design, conduct, and report a scientific study. Prerequisite: SpEd 6810. (3Sp)

7720 (d6720). Advanced Behavior Analysis in Education. Discussion of advanced topics and issues in behavior analysis, including rule-governed behavior, stimulus control, setting events, functional analysis, and verbal behavior. Topics integrated into educational practice. Prerequisite: SpEd 5050 or equivalent. (3F)

7800. Seminar: Issues in Special Education and Rehabilitation. Critical analysis of variety of special education and rehabilitation issues and trends. Empirical and theoretical information presented in a seminar format. (1-3F,Sp,Su) ®

7810. Research Seminar in Special Education and Rehabilitation. Identification of research problems and discussion of research strategies and methods. Applications of research, data analysis, and statistical concepts. (1-3F,Sp,Su) ®

7820. Seminar: Special Topics. Faculty develop courses around special topics in the fields of special education and rehabilitation. Students study these topics in depth, examining current research and theoretical positions. (1-3F,Sp,Su) ®

7830. Special Education Personnel Preparation Methods. Future teacher educators become versed in current training issues and demonstrate supervision and teaching competencies. (2Sp)

7900. Independent Study. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

7910. Independent Research. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

7920. Doctoral Program Professional Seminar. Orients new students to doctoral program, utilizing five goals: (1) familiarize students with requirements of the program and of the Graduate School, (2) acquaint students with the faculty and the resources available, (3) initiate a career planning process, (4) teach students some fundamental concepts underlying scientific research, and (5) teach students to conduct literature reviews. (2F)

7930. Internship in Special Education. Professional, supervised internship experience for doctoral students. Prerequisite: Permission of instructor. (1-12F,Sp,Su) ®

7940. Journal Reading Group. Under faculty direction, students learn to conduct critical analyses of research and theoretical journal articles. (1-2F,Sp,Su) ®

7950. Computer Competencies. Students learn and demonstrate skills in using word processing, spreadsheet, graphics, presentation, and statistical software. Emphasizes specific computer skills directly applicable to professional competencies. (1-2F,Sp,Su) ®

7970. Dissertation. Variable credit for dissertation project in connection with doctoral program in special education. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-12F,Sp,Su) ®

Rehabilitation Counseling Courses (Reh)

1010. Disability in the American Experience. Discussion of definitions and types of disabilities, ethical issues, society's prejudice and discrimination against people with disabilities, and the individual's adjustment to the disability experience. Disability as a natural part of life. (3)

6100. Introduction to Rehabilitation Counseling. Overview of history, philosophy, and legal basis of rehabilitation programs, both public and private. Independent living programs. Roles of the rehabilitation counselor and the processs of rehabilitation. Skill development including literature use, writing, and professional organizations. (3F)

6110. Medical Aspects of Disability. Overview of basic medical issues affecting employment and independent living for persons with disabilities. Explores basic anatomy and systems, as well as disorders and diseases of these systems. Covers medical terminology applicable to rehabilitation counseling. (3F)

6120. Psychosocial Aspects of Disability. Explores psychological and sociological aspects of disabilities, including adjustment factors in living with disabilities (i.e., individual, family, sexuality, other service providers, etc.). Examines societal attitudes, women's issues, and deaf culture issues. Includes group counseling applications for persons with disabilities. (3Sp)

6130. Rehabilitation Counseling Skill Development. Utilizes role playing of simulated interviews and rehabilitation counseling sessions to develop the basic skills necessary to function as a human service helper. Must be taken concurrently with Reh 6140. Prerequisites: Reh 6200 and permission of instructor. (2F,Su)

6140. Practicum in Rehabilitation. Under faculty supervision, students receive

minimum of 100 hours of firsthand experience working with persons with disabilities in rehabilitation agency or facility. Must be taken the first time concurrently with Reh 6130. With faculty approval, may be repeated for credit. Prerequisite: Permission of instructor. (1F,Sp,Su) ®

6150. Case Studies in Rehabilitation. Coordination of community resources, individual assessment information, ethical issues, eligibility determination, and development of individualized rehabilitation programs and independent living plans. Time, fiscal, and caseload management skills for rehabilitation professionals. Emphasizes client choice in rehabilitation planning. (3Sp)

6160. Job Analysis, Development, and Placement for Persons with Disabilities. Applies career development theories to job placement. Presents job placement factors resulting in employment for persons with disabilities, including job analysis, job development and retention, advocacy, assistive technology, ADA, occupational information systems, and labor market analysis. (3Sp)

6170. Internship in Rehabilitation. Direct supervised provision of rehabilitation services to persons with disabilities in a community facility or agency. Total of 300 hours of direct service required for each 6 semester credits. Repeatable for up to 12 credits. Prerequisite: Permission of instructor. (4-12F,Sp,Su) ®

6180. Rehabilitation of Persons with Severe Mental Illness, Substance Abuse, and Severe Learning Disabilities. Overview of rehabilitation of persons with severe mental illness, including psychopharmacology, housing, case management, job placement, diagnosis (DSM IV), and social learning programs. Includes information on rehabilitation of persons experiencing substance abuse, dual diagnoses, and learning disorders. (3Sp)

6190. Vocational Assessment for Persons with Disabilities. Addresses vocational assessment for persons with disabilities. Includes overview of traditional vocational assessment, but focuses on contemporary methodology developed for individuals with severe disabilities. Discussion of functional assessment, including client choice and ecological assessment issues. (3F)

6200. Theories of Counseling Applied to Persons with Disabilities. Introduction to established counseling theories and their implications for providing services to persons with disabilities. Discussion of individual and group counseling paradigms. Emphasizes development of students' individual counseling philosophies. (3F)

6210. Vocational Evaluation Principles and Systems. Introduction to vocational evaluation principles and their application in using commercially available vocational evaluation systems. Actual practice with the systems (including integrated report writing) in the rehabilitation services clinic. (2Su)

6220. Culturally Valid Rehabilitation Practices. Analysis of the effect of cultural/ethnic/racial/linguistic background in the rehabilitation counseling setting, including acceptance/perception of disability, and successful application, process, and rehabilitation outcome. Practice applications include provision of culturally sensitive counseling, vocational evaluation, and job placement. (2Su)

6560. Special Topics in Rehabilitation. Opportunity to provide specialized training in topics unique to rehabilitation. Topics cover many disability, employment, and independent-living issues. (1-4F,Sp,Su) ®

6900. Independent Study. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

6910. Independent Research. Prerequisite: Permission of instructor. (1-3F,Sp,Su) ®

6970. Thesis. (1-6F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Department of
Theatre Arts

College of Humanities, Arts and Social Sciences

Head: Professor *Colin B. Johnson*, theatre history and criticism, film
Office in Chase Fine Arts Center 232A, (435) 797-3046

Graduate Program Coordinator: Associate Professor *Nancy E. Hills*, costume history and design

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Professor *Sid. G. Perkes*, scene and costume design; **Associate Professors** *Kevin Doyle*, acting, directing, voice; *Lynda Linford*, acting, voice; **Assistant Professors** *Bruce L. Duerden*, technical theatre, lighting; *Dennis Hassan*, scene design; *Kirstie G. Rosenfield*, theatre history; *David E. Sidwell*, interpretation, storytelling, theatre education; **Lecturer** *Maggi E. Moar*, stage movement, dance

Degrees offered: Bachelor of Arts (BA), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Theatre Arts

Undergraduate emphases: *BA*–History and Dramatic literature (general theatre studies); *BFA*–Acting/Directing, Design (scenery, costume, lighting), Technical Practice (technical direction, stage management), Secondary Education Teaching; **Graduate specializations:** *MFA*–Advanced Technical Practice, Design (scenery, costume, lighting), Directing/Performance

Undergraduate Programs

Objectives

The primary mission of the Department of Theatre Arts is to offer a flexible program with the following objectives:

1. To teach appreciation and service courses contributing to the University Studies Program and the Liberal Arts and Sciences Program of the College of Humanities, Arts and Social Sciences and the College of Science;
2. To teach foundational and advanced specialized courses leading to professional preparation in performance, various types of theatre design, and technical practice with producing theatre organizations;

3. To train students for careers as theatre instructors in secondary schools and to provide service courses in support of the language arts curriculum of the State of Utah for elementary education majors;

4. To prepare students for advanced study and training;

5. To sponsor public production programs in which students can practice the art and craft of theatre and interpretive/narrative performance, which will substantially enhance the cultural life of the University community and region.

Production Groups and Theatres. The Theatre Arts Department sponsors the following production groups and divisions: Utah State Theatre, Old Lyric Repertory Company (summer), Studio/Conservatory Stage Series, Narrative Theatre, and Utah State Children's Theatre. Facilities used for performances by these groups include a 700-seat thrust stage in the Chase Fine Arts Center, the 388-seat proscenium Lyric Theatre in downtown Logan, and the flexible 112-seat Studio Stage. Facilities also include a costume shop, scenery shop, sound studio, design studio, dance and movement laboratory, and storage areas.

Requirements

Departmental Admission Requirements. Admission requirements are the same as those described for the University on pages 43-46. Students in good standing may apply for admission or transfer to the program. Students transferring from other institutions must have a minimum 2.5 GPA (on a scale of 4.0) regardless of credit amount transferred. Admission to specialized BFA programs by audition, interview, or portfolio review subsequent to admission to the department is explained below. Students must maintain an average 2.5 minimum GPA in all theatre classes required for graduation. No grade of less than a *C-* is accepted in any theatre class, and no required classes, regardless of department, may be taken on a *pass-fail* basis.

Core Courses. All Theatre Arts majors are required to complete the following core courses: Thea 1210, 1400, 1500, 3230, 3410. Entering and transfer students must complete a noncredit theatre orientation seminar. In addition, all students must complete 7 credits of production practicum work.

Bachelor of Arts Degree

General Theatre Studies (60 credits). Requirements are as follows: core courses and production work (22 credits); performance courses (12 credits); design/technical courses (8 credits); dramatic literature/history courses (16 credits); senior project/capstone (2 credits). To obtain a Bachelor of Arts degree, a student must fulfill the foreign language requirement (see page 48).

Bachelor of Fine Arts Degree

Program Entrance Requirements. Students seeking the BFA degree, with specialization in Acting/Directing or Design/Technical Practice, will be admitted by audition or a portfolio review. Periodic audition and review will be undertaken to assure good standing in these programs.

This degree is recommended for those students desiring more intensive preprofessional training in the discipline. It requires students to demonstrate a comprehensive mastery of acquired abilities in their emphasis area through periodic review of skills. Students in these programs also complete a capstone recital or project during their senior year.

Acting/Directing Emphasis. Candidates are accepted into the performance program through an audition and interview conducted by a BFA committee. Progress is monitored through periodic recitals/auditions before the same body. Transfer students are subject to the same acceptance process and progress review. Inquiries about specific requirements and expectations should be directed to the Theatre Arts Office.

Students seeking the BFA degree must work closely with advisers. Most University Studies courses and the core curriculum should be completed before the end of the sophomore year, as training is conducted in a manner adapted from conservatory methods. Individual needs, interests, and goals of the student are taken into consideration for selection of elective courses. The department maintains an updated course of study to aid the student in selecting courses in recommended sequence for the first two years of study. A student handbook and a procedures manual for productions are also available; these are designed to assist students who are presenting recitals, directing one-act productions, and preparing other projects.

Design/Technical Practice Emphasis. Candidates are accepted into the design/tech program upon interview and review of a portfolio by a BFA committee. The policies and recommendations for the performance emphasis also apply to this degree. Students may further specialize in costume, scenery, and lighting design, as well as technical theatre practice.

Theatre Arts Teaching Major—Theatre Arts Emphasis (33 credits). Requirements are as follows: core and performance or production practicum courses (22 credits); performance/directing courses (3 credits); theatre education/language arts courses (2 credits); design/technical courses (3 credits); theatre history/literature courses (3 credits). Students earning a secondary education credential must complete a professional education component of 35 additional credits, as well as an academic minor approved by the College of Education. All majors desiring a teaching credential must apply for admission to teacher education; it is recommended that this be done no later than the beginning of the sophomore year.

Theatre Arts Teaching Minor (19 credits)

Requirements are as follows: Thea 1210, 1400, 1500, 3410 (12

credits); production or performance practicum courses, Thea 2740/4740 or 2750/4750 (5 credits); theatre education/language arts courses, Thea 4330, 4340, or 5310 (2 credits). The requirements for this academic minor must be approved and monitored by the College of Education.

Academic Minor in Theatre Arts

Generally, a student interested in a theatre arts minor will complete the core course requirements.

Production Responsibilities

Because the production programs of the department are some of the most important training tools of the discipline, all majors and teaching minors are required to participate in them. A permanent theatre participation record is maintained for each student, and successful completion of crew and performance assignments is a requirement for graduation.

As a capstone experience to their university careers, all majors in their senior year are required to complete a project or recital appropriate to their area of emphasis.

Financial Support

Scholarships, grants-in-aid, and work-study opportunities are available through the University. In addition, the department offers talent awards and tuition scholarships. These are generally for one or two semesters of in-state tuition and may be renewed by reapplication for continuing students. Several auditions and interviews are scheduled during the year, both on-campus and at regional theatre conferences and festivals for new and transfer students. The department offers special work grants through its production program for qualified, skilled students. There are a number of named scholarships awarded to students qualifying under specific conditions. See the *Financial Aid and Scholarship Information* section of this catalog (pages 31-33) for more information.

Graduate Programs

Admission Requirements

All students making application to the MFA program, who cannot audition or interview with a member of the theatre arts faculty, must submit a resume and a portfolio with renderings, designs, photographs appropriate to the specialization, and any special letters of reference not included with the formal application to the School of Graduate Studies. The department accepts only one new student with an undergraduate degree in theatre into the Directing program each year. Applicants will be required to come to the campus or to meet with a faculty representative at a conference and complete a one-hour interview/demonstration. The candidate must submit a written concept statement for an assigned play, and then be observed by a faculty member while working with performers in a rehearsal environment.

The Miller Analogies Test (MAT) may be substituted for the more standard GRE, although the department does not recommended the MAT for international students.

Students who have received their undergraduate training at other institutions or in a discipline other than theatre will be expected to meet a proficiency equivalent to that of USU Theatre Arts graduates. This may require the student to complete the following minimum 20-credit program, which will not count toward the graduate degree: Thea 1400, 1500, 3230, 3410; 4 credits of Thea 4750; and 6 credits of elective Theatre Arts courses in one area. The student will be given credit for any equivalent courses taken within seven years prior to the date of admission.

Students accepted into the program must begin during the fall semester. The nature of the discipline and the program require that students maintain a continuous residence at the campus during the first year of study.

Master of Arts

The candidate for the 30 (minimum) credit MA degree will normally complete an original thesis, but may, with the approval of the supervisory committee, present a thesis alternative Plan B (36 credits minimum required).

Required courses (30 credits). Requirements are as follows: Thea 6010, 6180, 6240, 6270; two advanced dramatic literature courses selected from the Theatre Arts, English, or Languages and Philosophy departments; three 5000- or 6000-level Thea courses, two of which must be in a single area; and up to 8 credits of Thea 6970 (Thesis). Under special circumstances, a Plan B option in this program is available, requiring 12 credits of special project work and 3 credits of Thea 6970, for a total of 36 credits minimum.

In addition, the standard foreign language competency of 15 credits in one language is required for the MA degree (see page 65).

Master of Fine Arts

The candidate for the 60 (minimum) credit MFA must complete the Plan B program, and will undertake from three to five creative projects in the appropriate specialization. Under this plan, the required project reports customarily take the form of production books, journals, or a design or technical portfolio.

The normal residency is six semesters, including one or two summers in an established repertory or stock company or equivalent intern experience. Participation in the department's summer Old Lyric Repertory Company in Logan, Utah, satisfies this requirement. The nature of the discipline discourages credit by extension, large amounts of transfer credit, or numerous off-campus projects.

Required Courses. The program is completed in three phases, and while there may be considerable overlap between them, students undergo formal reviews before advancing to the next phase. The number of semesters given is approximate.

First and Second Semester—Entry Phase. Requirements are

as follows: *fall semester:* Thea 6010, 6180, 6800; *winter semester:* Thea 6240, 6270, and advanced courses in the area of specialization.

Upon or during completion of this phase, the student will: (1) submit a petition to advance to the next phase; (2) identify two to four projects for the next phase; and (3) nominate a supervisory MFA committee of at least three members for submission to the department head. A communication proficiency examination will be conducted at the conclusion of Thea 6180 (Theatre Production Portfolio) when the student presents his or her project to the Graduate Study Committee.

All of the above coursework (with the exception of the BA proficiency requirement, as necessary) must be completed, with grades recorded, prior to entry into the next phase. **A full-time student entering in the fall semester who does not complete the Entry Phase by the following summer will be subject to termination.**

Second to Fifth Semester—Project Phase. During this phase, the student must complete two courses in advanced dramatic literature, along with additional advanced courses in the area of specialization; must complete a cognate skill, consisting of the equivalent of 10 semester credits outside the department, to develop a skill or increase knowledge in a field related to the specialization, subject to approval by the adviser and Graduate Study Committee; must participate in the summer Old Lyric Repertory Company (4 credits, repeatable) or its equivalent in a recognized stock or repertory program, with a letter of satisfactory performance from the company director submitted to the department; and must complete two to four projects in the field of specialization (approximately 6-12 credits).

Upon completion of this phase, the student will: (1) submit a petition to advance to the final phase, the date of this depending upon individual progress; (2) submit proof that projects and the written reports for them have been completed; and (3) submit a proposal and/or preliminary work for a major or culminating project: renderings, preliminary working drawings, blocking script, and so forth.

Fifth and Sixth Semester—Culminating Phase. Requirements are as follows: Thea 6920 (4 credits), 6970; execution of a final, culminating project; a maximum of 3 thesis credits, taken to complete all reports; and completion of two to four additional 5000- or 6000-level elective courses.

Note: Whenever possible, graduate projects are proposed and executed as part of the Utah State Theatre artistic season. The option to cancel a student project or to allow work to proceed, but disqualify it as an MFA project based upon insufficient preparation or validity, rests with the Graduate Study Committee, the student's supervisory committee chairperson (adviser), and the executive producer of Utah State Theatre. This rule is designed to protect the integrity of the production priorities of the department.

Upon completion of this phase, the student will: (1) assemble the supervisory committee for a final review in a defense of the student's graduate work; and (2) file a complete copy of all Plan B reports with the department, in accordance with the procedures of the School of Graduate Studies. Copyrighted material, such as published scripts used for staging, will be filed separately in the Theatre Arts Office.

Financial Assistance

Teaching and general assistantships are awarded by the department. Assistantships are generally in the area of production, depending on theatre needs and the skills of applying students, and are renewable for up to three years. Application should be made directly to the department by February 1. Graduate students are not guaranteed financial assistance during their initial year of residence. In addition, several other grants and forms of support are available on a competitive basis.

Career Opportunities

The MA degree is a general, nonterminal degree designed to train students for further doctoral work in the discipline and to serve as a career upgrade for secondary school teachers. Students interested in teaching dramatic literature and theatre history and criticism at the postsecondary level should plan to use the MA as an intermediate degree for further PhD studies. A few two-year colleges employ MA graduates in teaching positions; however, almost no four-year colleges do so.

The MFA is designed for students pursuing careers in educational, professional, and regional theatres, or, in some cases, further doctoral-level work. It is regarded by most university and college administrations as a terminal degree for individuals with academic appointments as acting coaches, designers, and technicians. As with most institutions, the department makes no guarantee that its training will qualify its graduates to pass examinations administered by the theatrical trade unions or otherwise meet their full requirements for membership. MFA graduates are qualified to seek employment with regional and professional theatres, regardless of the guild or trade union status of these organizations.

Additional Information

Specific details about each of the foregoing programs are outlined in documents available through the department. Requirements are subject to change. Internet e-mail requests should be sent to: nhills@wpo.hass.usu.edu.

Theatre Arts Courses (Thea)

BCA 1010. Understanding Theatre. Survey of dramatic principles and structure, genre, and conventions. Functions and contributions of theatre artists and practices of the contemporary stage. (3F,Sp,Su)

BCA 1020. Introduction to Film. Study of elements of film narrative in fictional and nonfictional movies to provide a deeper understanding of content and film form. (3F,Sp,Su)

BHU 1030. Exploring Performance Through Literature. Introduces students to fundamental concepts and practices of oral language arts. Integrates listening, speaking, textual analysis, and reading by emphasizing oral communication and exploration of major literary genres. (3F,Sp,Su)

1210. Introduction to Playscript Analysis. Introductory course focusing on plot, character, language, and thematic analysis of varied historical and modern performance texts in the context of contemporary staging practice. Enrollment limited to theatre majors and minors. (3F)

1400. Acting I. Demonstration of skills in actor awareness (personal and group), organic acting techniques, scene study with partners, and monologue preparation. Provides understanding of theories and methodologies. Skills demonstrated in areas of body movement, diction, observation, concentration, imagination, and “action.” (3F,Sp)

1430. Stage Movement. Develops self-awareness through self-discipline. Emphasizes tension/relaxation, postural correction, balance, strength, flexibility,

breath control, and spatial exploration. Study of realistic mime and Commedia dell'Arte gives students fundamental technique and enhances character study. (1F,Sp)

1450. Voice for the Theatre. Training in understanding of the physiology of the vocal instrument. Training in the International Phonetic Alphabet, a standard in pronunciation. Work in various vocal theories (Barry, Linklater, Lessac). Development of skills through exercise and performance. (1F,Sp)

1500. Stage and Costume Crafts. Introduction to different physical theatre forms, standard stage equipment, and methods of staging plays. Basic practices in set construction, stage lighting, sound, and costume construction. (3F,Sp)

1530. Stage Makeup. Emphasizes one-dimensional and three-dimensional illusional work, focusing on knowledge and skills in "corrective" aging and period makeup, with introductions to related areas, such as hair, hands, and prosthetics. (2Sp)

2400. Acting II. Demonstration of textual analysis for the actor. Study and performance of characters from modern drama. Continued mastery of body and vocal techniques. Prerequisite: Thea 1400. (3F,Sp)

2430. Pantomime and Movement. Theory and practice in stylized mime for the theatre. Emphasis on creative approach for projecting character, emotion, and mood through the use of the body. History and physical experience in Commedia dell'Arte. Prerequisite: Thea 1430. (1Sp)

2440. Musical Theatre Dance: Tap and Jazz Emphasis. Prepares students in fundamental and technical skills of tap and jazz. Brief history of musical theatre included to emphasize styles. Prerequisites: Thea 1430, 2430. (1Sp)

2510. Scene Painting/Properties. Instruction in scene painting techniques. Construction and alteration of stage properties. Geared to theatrical technicians and designers. Demonstration and lab work included. Prerequisite: Thea 1500. (2Sp)

2540. Lighting Design. Introduction to basic elements of lighting design. Demonstration of techniques used to create and execute a lighting design. Provides basic understanding of light energy, angle, color, and technology available for designing with this medium. (2F)

2550. Stage Management. Provides sheltered environment for students to acquire knowledge and skills necessary for becoming a competent stage manager. Discussion of organization, delegation, scheduling, and personnel management. Prerequisite: Thea 1500. (2Sp)

2560. Theatre and Studio Sound. Sound recording, reinforcement, and control operation skills for theatrical production. (2F,Sp)

2740. Performance Practicum. Specialized work in production performance. Prerequisite: Permission of instructor, granted following successful audition. (1-2F,Sp) ®

2750. Production Practicum. Specialized crew work in ongoing Theatre Arts Department productions. Prerequisite: Permission of instructor. (1-2F,Sp,Su) ®

3050. Period Styles. Intensive instruction in architecture, furniture, and interior design of major Western European periods from Egyptian to the present. Taught through lectures, slide presentations, and student-compiled source book with examples of major styles. (3Sp)

3230. Survey of Western Theatre. History of performance traditions, theatre architecture, management systems, personnel, and written drama in the West from ancient Egypt to mid-20th Century. (3F)

3300. Clinical Exerience in Teaching I. Clinical apprenticeship consisting of teaching theatre in local schools. Includes observation, tutorial work, small group discussions, whole class instruction, and lesson/unit planning. (1F,Sp)

3410. Directing. Provides instruction and practice in play selection, script analysis, research, blocking, leadership, communication skills, conduct of rehearsals, self-awareness, production organization and operation, and personal organization for stage direction. Principles apply in professional, civic, and educational settings. Prerequisite: Thea 1400. (3Sp)

3430. Period Dance Styles. Dances learned from different periods then "rechoreographed" for stage practice. Prerequisites: Thea 2440 and 3410. (1F)

3440. Musical Theatre Dance: Ballet and Modern Emphasis. Introduces students to classical dance forms. Develops coordination, ease, and poise in handling the body. Focuses on dance as an art form, using the body as a means of expression. Prerequisites: Thea 1430 and 2440. (2F)

3510. Scene Design. Preparation for designing sets used in theatre. Development of skills in drafting, rendering, model-making, research, and portfolio development. Prerequisite: Thea 1500. (2F)

3520. Stage Costume Design. Theory and practice in design and selection of costumes for nonrealistic, historical, and modern plays. Study of relationship of costume to character and production. Prerequisite: Thea 1500. (2Sp)

3570. Historic Costume for the Stage. Historic survey of development of clothing from ancient Egyptians to the present day. (3F)

4030 (d6030).[1] Storytelling. Reviews background and techniques of traditional telling. Explores psychological, educational, therapeutic, historical, and folkloric aspects of storytelling. For 6030 credit, graduate students must participate in microteaching sessions in areas of expertise, with additional storytelling research or service. (3F,Sp,Su)

4250. Playwriting. Study of dramatic theory and sample plays, combined with practice in writing short plays. Minimum of three plays required. Prerequisite: Thea 1210. (3F)

4300. Clinical Experience in Teaching II. Clinical apprenticeship of teaching theatre in local schools, including observation, tutorial work, small group discussions, whole class instruction, and lesson/unit planning. Prerequisite: Thea 3300. (1F)

4330 (d6330). Performance Workshop in Children's Literature. Performance and teaching strategies for children's poetry, prose, drama, and other literature forms using interpreter's theatre, story drama, performance art, puppetry and masks, choral reading, and other tools. For 6330 credit, graduate students must participate in microteaching sessions with additional performance, writing, or service assignments. (2F,Sp)

4340 (d6340). Drama and Dramatics for Children. Techniques for using drama and selecting/directing drama for children in the classroom and beyond, with background in drama and the psychology of learning, creative dramatics, and children's theatre. For 6340 credit, graduate students must participate in microteaching sessions with additional research, writing, or service assignments. (2F)

4400. Company Workshop. Company workshop of theatrical productions emphasizing process and instruction. Supervised rehearsals, technical preparation, and public performances. Prerequisite: Permission of instructor. (3F,Sp) ®

4460 (d6460). Creating and Staging Alternative Texts. Advanced solo and group performance of literature. Selection and adaptation of literature for performance, directing techniques for interpreter's theatre, and experimental forms of drama with literary foundations. For 6460 credit, graduate students must participate in microteaching sessions with additional staging or service assignments. (2F,Sp)

4480 (d6480). Theatre Leadership and Management. Explores legal and financial choices, market research and marketing plans, physical plant and season operations, consideration of union and management relationships, and various planning and budget control procedures. For 6480 credit, graduate students must participate in

microteaching sessions with additional practicum, writing, or problem solving assignments. (3Sp)

4510 (d6510). Advanced Scene Design. Preparation for graduate school or a career in design. Advanced instruction in drafting, rendering, model-making, technical skills, research, design principles, and portfolio development. For 6510 credit, graduate students must participate in microteaching sessions with additional rendering assignments. Prerequisites: Thea 1500 and 3510. (2Sp)

****4520 (d6520). Advanced Costume Design.** Advanced theory and practice in the design and selection of costumes for nonrealistic, historical, and modern plays. For 6520 credit, graduate students must participate in microteaching sesions with additional research or practicum assignments. Prerequisite: Thea 3520. (2Sp)

****4540 (d6540). Advanced Lighting Design.** Advanced training in elements of lighting design. Exploration of advanced techniques used to create and execute a lighting design. For 6540 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: Thea 2540. (2Sp)

4740. Advanced Performance Practicum. Specialized advanced work in production performance. (1-2F,Sp) ®

4750. Advanced Production Practicum. Provides specialized practical experience in theatre production process, including advanced opportunities to work in directing, design, scene construction, costume construction, stage management, props, sound, and lighting, under the supervision of theatre arts faculty. (1-3F,Sp) ®

DHA 5240 (d6240). Contemporary Theatre. History and theory of a theatre movement since the 1960s, primarily in the English-speaking world, leading to a study of the theatrical world and its practices today. For 6240 credit, graduate students must participate in microteaching sessions with additional reading or writing assignments. Prerequisite: Thea 3230. (3Sp) ®

5270 (d6270). Performance Theory and Criticism. Topics in dramatic theory, including traditional Aristotelian analysis, comedy, tragedy, and modern performance theory. Includes preparation for review and adjudication of performance. For 6270 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. (3F) ®

5290 (d6290). Special Topics in Theatre History. Specialized topics in theatre history, performance, and dramatic literature. Sample topics include Classical Theatre of Greece and Rome, Golden Age Spanish Theatre, Elizabethan Theatre, Musical Theatre, Asian Theatre, and others, depending on faculty specialty. For 6290 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. Prerequisite: Thea 3230. (2F,Sp) ®

5310. Theatre Mentorship. Clinical mentorship of teaching skills, including observation, instruction, and evaluation in specific areas of expertise. Permission of instructor required. (1F,Sp) ®

5370. Methods in Teaching Theatre and Speech. Development of materials and strategies for teaching secondary school speech and theatre. Team taught by Speech and Theatre Arts faculties. Prerequisite: Admission to teacher education. (3F)

5390. Student Teaching Seminar. Focuses on problems arising during student teaching. Includes plans, procedures, adaptive classroom strategies, and evaluation. (2F,Sp)

5400 (d6400). Advanced Acting: Special Topics. Advanced acting course emphasizing performance technique and creative approaches to the role. Subject/period/genre varies by instructor on a rotational basis. For 6400 credit, graduate students must participate in coaching sessions with additional service assignments. Prerequisites: Thea 1400 and 2400. (3F,Sp) ®

5410 (d6410). Advanced Directing. Provides instruction and practice in advanced techniques of script analysis, research outside the discipline, review of literature, awareness of thinking styles and values, and preparation for studio directing assignments. For 6410 graduate credit, students must complete additional projects in staging classics and research reading list. (3F)

5510. Computer-Aided Design for Theatre. Computer-aided design applications for theatre. Drafting and rendering on computer for set, light, and costume design. Prerequisites: Thea 2540, 3510, 3520. (3)

5590. Design Studies. Actualization of a design from conception through completion with faculty supervision. Creation of all drafting, renderings, and/or models by deadlines, handling complications, overseeing properties acquisition and set dressing, and documenting design for portfolio presentation. Prerequisite: Thea 3510. (3)

5740 (d6740). Repertory Theatre Performance. Rehearsal, crew, and staff assignments. Performance of four plays in repertory. Company members selected through audition, based on ability and commitment to theatre. For 6740 credit, graduate students fulfill mentoring assignments and/or additional assignments in community service. Enrollment limited and by permission of Theatre Arts Department staff. (2-8Su) ®

5750 (d6750). Repertory Theatre Production. Rehearsal, crew, and staff assignments. Performance of four plays in repertory. For 6750 credit, graduate students work with undergraduate students in mentoring situations. (2-8Su) ®

5900. Special Projects. Directed individual research studies or creative projects in theatre. (1-4F,Sp) ®

6010. Introduction to Graduate Study in Theatre. Bibliography, research methods, and writing. (2F)

6030 (d4030). Storytelling. Reviews background and techniques of traditional telling. Explores psychological, educational, therapeutic, historical, and folkloric aspects of storytelling. For 6030 credit, graduate students must participate in microteaching sessions in areas of expertise, with additional storytelling research or service. (3F,Sp,Su)

6180. Theatre Production Portfolio. Creation of a design portfolio for a single production. An integrative, diagnostic course. (2F)

6240 (d5240). Contemporary Theatre. History and theory of a theatre movement since the 1960s, primarily in the English-speaking world, leading to a study of the theatrical world and its practices today. For 6240 credit, graduate students must participate in microteaching sessions with additional reading or writing assignments. Prerequisite: Thea 3230. (3Sp) ®

6270 (d5270). Performance Theory and Criticism. Topics in dramatic theory, including traditional Aristotelian analysis, comedy, tragedy, and modern performance theory. Includes preparation for review and adjudication of performance. For 6270 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. (3F) ®

6290 (d5290). Special Topics in Theatre History. Specialized topics in theatre history, performance, and dramatic literature. Sample topics include Classical Theatre of Greece and Rome, Golden Age Spanish Theatre, Elizabethan Theatre, Musical Theatre, Asian Theatre, and others, depending on faculty specialty. For 6290 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. Prerequisite: Thea 3230. (2F,Sp) ®

6330 (d4330). Performance Workshop in Children's Literature. Performance and teaching strategies for children's poetry, prose, drama, and other literature forms using interpreter's theatre, story drama, performance art, puppetry and masks, choral reading, and other tools. For 6330 credit, graduate students must participate in microteaching sessions with additional performance, writing, or service assignments. (2F,Sp)

6340 (d4340). Drama and Dramatics for Children. Techniques for using drama and selecting/directing drama for children in the classroom and beyond, with

background in drama and the psychology of learning, creative dramatics, and children's theatre. For 6340 credit, graduate students must participate in microteaching sessions with additional research, writing, or service assignments. (2F)

6400 (d5400). Advanced Acting: Special Topics. Advanced acting course emphasizing performance technique and creative approaches to the role. Subject/period/genre varies by instructor on a rotational basis. For 6400 credit, graduate students must participate in coaching sessions with additional service assignments. Prerequisites: Thea 1400 and 2400. (3F,Sp) ®

6410 (d5410). Advanced Directing. Provides instruction and practice in advanced techniques of script analysis, research outside the discipline, review of literature, awareness of thinking styles and values, and preparation for studio directing assignments. For 6410 graduate credit, students must complete additional projects in staging classics and research reading list. (3F)

6460 (d4460). Creating and Staging Alternative Texts. Advanced solo and group performance of literature. Selection and adaptation of literature for performance, directing techniques for interpreter's theatre, and experimental forms of drama with literary foundations. For 6460 credit, graduate students must participate in microteaching sessions with additional staging or service assignments. (2F,Sp)

6480 (d4480). Theatre Leadership and Management. Explores legal and financial choices, market research and marketing plans, physical plant and season operations, consideration of union and management relationships, and various planning and budget control procedures. For 6480 credit, graduate students must participate in microteaching sessions with additional practicum, writing, or problem solving assignments. (3Sp)

6510 (d4510). Advanced Scene Design. Preparation for graduate school or a career in design. Advanced instruction in drafting, rendering, model-making, technical skills, research, design principles, and portfolio development. For 6510 credit, graduate students must participate in microteaching sessions with additional rendering assignments. Prerequisites: Thea 1500 and 3510. (2Sp)

****6520 (d4520). Advanced Costume Design.** Advanced theory and practice in the design and selection of costumes for nonrealistic, historical, and modern plays. For 6520 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: Thea 3520. (2Sp)

****6540 (d4540). Advanced Lighting Design.** Advanced training in elements of lighting design. Exploration of advanced techniques used to create and execute a lighting design. For 6540 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: Thea 2540. (2Sp)

6740 (d5740). Repertory Theatre Performance. Rehearsal, crew, and staff assignments. Performance of four plays in repertory. Company members selected through audition, based on ability and commitment to theatre. For 6740 credit, graduate students fulfill mentoring assignments and/or additional assignments in community service. Enrollment limited and by permission of Theatre Arts Department staff. (2-8Su) ®

6750 (d5750). Repertory Theatre Production. Rehearsal, crew, and staff assignments. Performance of four plays in repertory. For 6750 credit, graduate students work with undergraduate students in mentoring situations. (2-8Su) ®

6790. Seminar in Drama. Flexible service topics course covering a range of topics according to individual student need and/or visiting instructors, independent study, etc. (1-4F,Sp) ®

6800. Graduate Studies in Theatre. Research and preparation for graduate practicum projects in theatre. (1-6F,Sp) ®

6920. Graduate Projects in Theatre. Studio practicum in support of projects in stage directing, design, and technical practice. (2-3F,Sp) ®

6970. Thesis. (1-4F,Sp) ®

6990. Continuing Graduate Advisement. (1-2F,Sp) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Interdepartmental Program in
Toxicology

Director: Professor *Roger A. Coulombe, Jr.*, molecular and natural product toxicology (ADVS)
Office in Animal Science 213, (435) 797-1600

FAX (435) 797-1601
E-mail rogerc@cc.usu.edu
WWW http://www.usu.edu/~gradsch/toxic/index.htm

Professors *Anne J. Anderson*, plant toxicology (Biology); *Steven D. Aust*, biochemical toxicology (Chemistry); *William A. Brindley*, insecticide toxicology (Biology); *Carl D. Cheney*, behavioral toxicology (Psychology); *R. Ryan Dupont*, biological waste treatment (CEE); *Ronald C. Sims*, environmental engineering (CEE); **Associate Professors** *Ann E. Aust*, chemical carcinogenesis (Chemistry); *Howard M. Deer*, pesticides and occupational health (ADVS); *William J. Doucette*, fate of chemicals in the environment (CEE); *David B. Drown*, industrial hygiene (Biology); *Michael J. McFarland*, hazardous waste management (CEE); **Assistant Professor** *Jeffrey O. Hall*, veterinary toxicology (ADVS); **Research Associate Professor** *Darwin L. Sorensen*, aquatic toxicology (Biology); **Adjunct Professor** *Lynn F. James*, poisonous plant toxicology (USDA); **Adjunct Associate Professors** *Kip E. Panter*, poisonous plants (USDA); *James A. Pfister*, behavioral toxicology of range plants (USDA)

Degrees offered: Master of Science (MS) and Doctor of Philosophy (PhD) in Toxicology

Specialization: Molecular Biology

Graduate Programs

USU's Toxicology Program is one of the first degree-granting graduate toxicology programs in the country. Established in 1963, the program has trained over 110 students who have received MS and PhD degrees. Basic and applied research and study in toxicology are interdisciplinary and interdepartmental, with an emphasis on environmental toxicology. Students affiliate with the program through the following departments: Animal, Dairy and Veterinary Sciences (ADVS); Biology; Chemistry and Biochemistry; Psychology; or Civil and Environmental Engineering (CEE). The Ecology Center, Utah Water Research Laboratory, and USDA Poisonous Plants Laboratory also provide facilities and research projects for study. A specialization in toxicology/molecular biology is available.

Admission Requirements

Students with a bachelor's degree in life sciences, physical science, medical science, or engineering and with adequate preparation in chemistry, biology, physics, and/or mathematics are eligible. Admission to the program requires approval of the professors and compliance with the general admission requirements of the University.

Major Research Areas

Molecular Toxicology. Modern molecular biological techniques are used to determine the mechanisms of carcinogenesis and toxicology by examining how various natural and synthetic compounds interact with cellular macromolecules, such as DNA. Resultant mutations on oncogenes and tumor suppressor genes are being investigated, as these are thought to be important in the development of cancer. Chemoprevention agents naturally-present in the diet, which can interrupt the cancer process, thereby reducing cancer incidence, are also studied.

Biochemical Toxicology. Specific studies include macromolecular interactions with chemicals, including pharmacokinetics and subcellular distribution, enzyme inhibition and kinetics, effects of toxicants upon macromolecular syntheses and metabolic intermediates, and free-radical mechanisms.

Biodegradation and Hazardous Waste Management. Utah State University is a recognized leader in discovering basic biological, chemical, and physical methods to reduce hazardous substances. Models are developed and tested for dealing with the migration of chemicals in the environment.

Natural Product Toxicity and Food Toxicology. People are exposed to roughly 10,000 times more natural toxins in their diets than residues of synthetic or “man-made” toxins, such as residues of pesticides, PCBs, and dioxins. The risk to animal and human health posed by natural toxins far exceeds that posed by the synthetic variety. Work is ongoing to identify and control the presence of food-borne toxicants, as well as to determine their mechanism of action.

Immunotoxicology. Low-level exposure to chemicals can alter host resistance to various infections. Ongoing projects include studying the mechanisms of toxic impact on the immune system, including detrimental effects of toxicants on various immune cells.

Toxicology of Pesticides and Industrial Compounds. The possible consequences of pesticides and other chemicals of industrial importance on people and on the environment are important research topics at USU.

Veterinary Toxicology. Reducing the toxicological impact of natural and synthetic chemicals on domestic animals is an important emphasis.

Course Requirements

The following core courses are required: ADVS 5400, 6350, 6600, and 6810. Supporting core courses include: Biol 5500 and/or 5510; Chem 5700, 5710; and Stat 3000.

Additional coursework is determined by the supervisory committee, and depends on the area of emphasis. Approximately one-third of the MS and one-half of the PhD work consists of research necessary to complete a thesis or dissertation.

Interdepartmental Program in
Watershed Science

College of Natural Resources

Acting Director: *James P. Dobrowolski*, Associate Professor
Office in Biology and Natural Resources 179, (435) 797-2547

FAX (435) 797-3796
E-mail watersci@cc.usu.edu
WWW http://www.usu.edu/~cnr/watershed/waterhme.htm

Teaching Advising Core Faculty:

Professors *Charles P. Hawkins*, stream and riparian ecology, Fisheries and Wildlife; *Wayne A. Wurtsbaugh*, limnology and lake management, Fisheries and Wildlife; **Associate Professors** *James P. Dobrowolski*, watershed hydrology, management, and restoration, Rangeland Resources; *Joanna L. Endter-Wada*, water resources policy, Forest Resources; *Michael P. O'Neill*, watershed and geography

extension, Geography and Earth Resources; *John C. "Jack" Schmidt*, fluvial geomorphology and water resources policy, Geography and Earth Resources; *Helga Van Miegroet*, nutrient cycling and biogeochemistry, Forest Resources; **Research Associate Professor** *Jeffrey L. Kershner*, fisheries habitat relationships and management, Fisheries and Wildlife

Graduate Advising Core Faculty:

Associate Professors *Mark W. Brunson*, human dimensions of watershed management, Forest Resources; *Todd A Crowl*, stream ecology/biometry, Fisheries and Wildlife; **Assistant Professor** *David A. Beauchamp*, lake and reservoir operations

Affiliate Faculty:

Professors *Raymond D. Dueser*, fisheries and wildlife, Fisheries and Wildlife; *John A. Kadlec*, wetland ecology and management, Fisheries and Wildlife; *Upmanu Lall*, surface water hydrology, Civil and Environmental Engineering; **Associate Professors** *Thomas B. Hardy*, instream flow modeling, Civil and Environmental Engineering; *Michael J. Jenkins*, snow avalanche dynamics, Forest Resources; *Thomas E. Lachmar*, groundwater geology, Geology; *Chris Luecke*, lake fisheries management, Fisheries and Wildlife; *Christopher M. U. Neale*, remote sensing and videography, Biological and Irrigation Engineering; *R. Douglas Ramsey*, remote sensing/geographic information systems, Geography and Earth Resources; *G. Allen Rasmussen*, range and riparian management, Rangeland Resources; *David L. Tarboton*, geomorphology and hydrology, Civil and Environmental Engineering; **Assistant Professors** *Robert R. Gillies*, climatology, Geography and Earth Resources; *Darrell S. Kaufman*, quaternary geology

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Watershed Science

Undergraduate Programs

Objectives

Watershed science is the interdisciplinary study of the physical, chemical, biological, ecological, and human interactions within headwater drainage basins affecting any aspect of the storage and movement of water through those basins, the quality of that water, and those ecological resources that depend on water. Although drainage basins occur at all scales, the focus of watershed science is primarily on watersheds of 10's to 1,000's of square kilometers in size, where runoff and sediment yield determine the characteristics of major rivers that are located further downstream. Consequently, watershed scientists primarily focus on wildland systems with an emphasis on the processes that link physical and ecological elements. Watersheds have been long recognized as fundamental landscape units. In the late 1800's, John Wesley Powell advocated that counties in the Intermountain West be organized within the context of drainage basins. The National Forest system was established on this basis. Watersheds are thus a fundamental natural resource unit. They are distinct landscape features within which water interacts to influence and link forest, rangeland, and aquatic ecosystems. The emphasis of watershed science is on the development of scientific understanding and management of water resources within wildland ecosystems. Watershed scientists do not typically design irrigation systems, canals, or dams; assess sediment production from intensively cultivated fields; or measure runoff from urban landscapes. However, watershed scientists may be involved in assessing the effects these activities have on up- or downstream conditions such as water quality and quantity, stream channel structure, riparian communities, and the viability of aquatic biota.

The Watershed Science Unit administers an interdepartmental program between the departments of Fisheries and Wildlife, Forest Resources, Geography and Earth Resources, and Rangeland Resources that addresses water resources issues within a natural resources context. Course requirements in the physical, biological, and social sciences provide the student with a broad-based experience that is both challenging and integrated.

Requirements

Bachelor of Science in Watershed Science

Admission Requirements. Admission requirements for the Watershed Science program are the same as those described for the College of Natural Resources (page 84).

Graduation Requirements. All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. The average Grade Point Average (GPA) for courses taken from the College of Natural Resources must be 2.5 or greater.

All Watershed Science majors must complete the **communication skills/economics courses:** Econ 1500, Spch 3050, Comm 3320; and **supporting math and science courses:** Biol 1210, 1220, 1230, Bmet 4300, Chem 1210, 1220, 1230, Geog 3500, 3600, Geol 1150, 5510, Math 1210, Phyx 2110, Soil 3000, Stat 3000. Majors must also complete the **Natural Resources core courses:** NR 2220, 2340, 3000, 3600, 4000; and the **Watershed Science core courses:** WS 3700, 4490, 4500, 5150, 5320, 5500, 5640, 5660, 5670. Six to twelve credits of electives must be selected from the following categories: **Physical Science**, CEE 3430, 5620, FR 5350, Geog 5160, Soil 5650; **Watershed Ecology,** FR 3250, FW 4510, 5400, RLR 5610; **Watershed Management Tools,** Geog 5930, RLR 5630, MHR 3710, Math 1220, 2280; **Watershed Policy,** FW 4100, FR 5560, Geog 5330, PolS 3810, 4820, RLR 5100, Soc 4620.

Minor in Watershed Science (17-19 credits). For the Watershed Science minor, students must complete WS 3700, 4490, 5500; plus two courses selected from the following: WS 4500, 5150, 5640, 5660.

Additional Information

For more information about Bachelor of Science degree requirements and the sequence in which courses should be taken, see the major requirement sheet, available from the Director of the Watershed Science Unit or the College of Natural Resources Dean's Office. For updated information about new courses, course scheduling, seminars, career possibilities, and undergraduate opportunities in research, students should check with their faculty adviser and the Watershed Science Unit web page at http://www.usu.edu/~cnr/watershed/waterhme.htm.

Financial Support

Scholarships are awarded for scholastic and professional

achievements at the department, College of Natural Resources, and University level. Contact departmental and CNR academic advisers for more information. Grants-in-aid and work study are available from the Financial Aid Office and Student Employment Office, respectively. In addition, unit researchers employ students to assist in watershed science research. Some of the research programs that involve undergraduate students include field data collection to solve problems in river geomorphology, stream ecology, biogeochemistry, large scale watershed processes, and policy issues. Cooperative education and internship experiences are coordinated by the University Placement Office.

Graduate Programs

Admission Requirements

Applicants should have a bachelor's degree in a physical, chemical, or biological discipline relevant to their chosen area of emphasis. Appropriate degrees include those in watershed science, water resources, forestry, rangeland resources, aquatic ecology, physical geography, environmental engineering, and interdisciplinary degrees in biological, chemical, or environmental studies. Applicants should have at least two semesters of calculus, a year of both chemistry and biology, and at least one semester of both physics and statistics. Students without these courses may be admitted, but will be expected to make up any deficiencies in addition to completing courses required for the graduate degree. A minimum undergraduate GPA of 3.0 and verbal and quantitative GRE scores at or above the 40th percentile are required. A combined verbal and quantitative GRE score of 1,200 or greater is desired.

Specializations

Students can pursue MS and PhD degrees emphasizing watershed hydrology, watershed ecology, or watershed management. The curriculum is interdisciplinary in nature and designed to provide the flexibility necessary to meet student needs and societal demands for natural resource management.

Course Requirements

Students will develop individually tailored programs of study with approval of their advisory committees. Coursework will include some or all of the specialty courses listed under Watershed Science, in addition to courses offered through Forest Resources, Fisheries and Wildlife, Geography and Earth Resources, Rangeland Resources, Civil and Environmental Engineering, and Mathematics and Statistics.

Watershed Science Courses (WS)

3700. Fundamentals of Watershed Science. Study of water movement, hillslope processes, and nutrient movement in catchments, and its relevance to the properties, land use, and management of watersheds as natural resource units. Prerequisite: Soil 3000 or permission of instructor. (3Sp)

4490 (d5490).[1] Small Watershed Hydrology. Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research findings for examining key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Also taught as RLR 4490/5490. Prerequisites: Math 1210, WS 3700. (4F)

4500. Freshwater Ecology. Ecosystem analysis of physical, chemical, and biological interactions in lakes and streams. Application of these concepts for managing aquatic system. Prerequisites: Chem 1210, 1220; Phyx 1200. (3F)

4510. Aquatic Ecology Laboratory. Integration of limnological theory and methods of conducting field and laboratory analyses of physical, chemical, and biological parameters in writing. Field trips required. Prerequisite: FW/WS 4500 (may be taken concurrently). (2F)

4800. Undergraduate Research. Individual or team research. Prerequisite: Adviser approval. (2F,Sp) ®

5150 (d6150). Fluvial Geomorphology. Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisites: Calculus, physics, applied hydraulics, and geomorphology. (4F)

5320. Water Law and Policy in the United States. Introduction to policies, laws, institutions, and practices guiding western water allocation, emphasizing how to efficiently and equitably allocate increasingly scarce supplies. Explores reserved water rights, water markets, stream adjudication, public trust doctrine, basinwide management, and riparian management. (3F)

5330 (d6330). Large River Basin Management: History, Politics, and Science. Focuses on constituencies participating in modern management of large river basins, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (3Sp)

5460. Avalanche and Snow Dynamics. Fundamentals of snow and avalanche dynamics. Avalanche safety, forecasting, hazard evaluation, and control. (2Sp—first half)

5490 (d4490). Small Watershed Hydrology. Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research findings for examining key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Additional oral and written assignments required for graduate students. Also taught as RLR 5490/4490. Prerequisites: Math 1210, WS 3700. (4F)

5500. Water Quality and Pollution. Reviews biological and social problems caused by water pollution and land use; toxicology, water quality parameters, and use criteria related to the Clean Water Act; and sampling techniques. Also taught as FW 5500. Prerequisites: Chem 1230; one of WS 3700, CEE 3610, or FW/WS 4500. (3Sp)

***5640. Riparian Ecology and Management.** Explores structure and function of reparian ecosystems and management options for maintaining sustainable ecological function. Prerequisites: WS 3700 and NR/Biol/FW 2220 or permission of instructor. (3Sp)

****5660. Restoration of Wildland Watersheds.** Features problem analysis, objective setting, and application of methods and monitoring. Provides detailed exploration of implications of restoration treatments to: the partitioning and timing of water through the hydrologic cycle, stream channel and hillslope stability relationships, sediment and nutrient fluxes, biodiversity and productivity, and land management.

Prerequisites: WS 4490, 5150, 6800; RLR 5610 (or equivalent). Registration by Watershed Science majors requires permission of the Watershed Unit director. (3Sp)

5670. Restoration of Wildland Watersheds Practicum. Practical field-oriented course to accompany WS 5660. (1Sp)

6100. Aquatic Production and Fish Ecology. Reviews current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Analyzes physiological, behavioral, population, and community concepts of fish interactions with their environment. Prerequisite: FW/WS 4500 or equivalent, or instructor's permission. (3Sp)

6150 (d5150). Fluvial Geomorphology. Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisites: Calculus, physics, applied hydraulics, and geomorphology. (4F)

****6200. Biogeochemistry of Terrestrial Ecosystems.** Inputs, outputs, and cycling patterns of major nutrients. Emphasis on mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: Biol 1220, Soil 3000, Chem 2300 or 2310, or permission of instructor. (3F)

6330 (d5330). Large River Basin Management: History, Politics, and Science. Focuses on constituencies participating in modern management of large river basins, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (3Sp)

****6520. Applied Hydraulics.** Basic fluid mechanics applied to wildland watershed systems and directed at nonengineering students. Explores nature of fluid state, fluid motion, and steady uniform and varied flow in open channels, under both subcritical and supercritical conditions. Surveys concepts of boundary layers, turbulence, convection, dispersal, and wave formation in unsteady flows. Emphasizes problem formulation and solving. Prerequisites: WS 4490; Math 2280 (recommended). (3F)

6800. Stream Ecology. Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/Biol/FW 2220 and FW/WS 4500. (2F)

6810. Stream Ecology Laboratory. Presents advanced techniques for study of stream ecosystems. Emphasizes techniques for quantifying physical and biotic structure of streams. Each student designs and carries out independent field project. Prerequisites: NR/Biol/FW 2220, FW/WS 4500, 4510, and concurrent enrollment in FW/WS 6800. (2F)

6820. Watershed Science Seminar. Advanced topics in watershed science and management. Topics will rotate each year. Requires oral presentation covering a selected aspect of the term's topic and a short summary paper. Emphasis on integrating across water resource disciplines and improving oral and written communication skills. Required for all watershed science graduate students. Prerequisite: Graduate standing. (2F,Sp) ®

6900. Watershed Science Problems. Individual study and research upon selected problems in watershed science and related subjects. (1-6F,Sp,Su) ®

6970. Watershed Science Thesis. Original research and study on a problem in watershed science and related subjects. (1-15F,Sp,Su) ®

6990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

***7100. Aquatic Production and Fish Ecology.** Reviews current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Analyzes physiological, behavioral, population, and community concepts of fish interactions with their environment. Prerequisite: FW/WS 4500 or equivalent, or instructor's permission. (3Sp)

***7640. Riparian Ecology and Management.** Explores structure and function of riparian ecosystems and management options for maintaining sustainable ecological function. Prerequisites: FR/RLR/WS 3700 and NR/Biol/FW 2220 or permission of instructor. (3Sp)

7800. Stream Ecology. Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/Biol/FW 2220 and FW/WS 4500. (2F)

7810. Stream Ecology Laboratory. Presents advanced techniques for study of stream ecosystems. Emphasizes techniques for qualifying physical and biotic structure of streams. Each student designs and carries out independent field projects. Prerequisites: NR/Biol/FW 2220, FW/WS 4500, 4510, and concurrent enrollment in FW/WS 7800. (2F)

7970. Watershed Science Dissertation. Original research and study on a problem in watershed science and related subjects. (1-15F,Sp,Su) ®

7990. Continuing Graduate Advisement. (1-3F,Sp,Su) ®

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[1]Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Taught 1998-99.

**Taught 1999-2000.

Other University Components

Intercollegiate Athletics—Men and Women

Athletic Director: Bruce Van De Velde
Office in Spectrum Addition 202
tel. (435) 797-1850

Associate Athletic Director for External Operations: M. Rance Pugmire
Associate Athletic Director for Internal Operations: Mary Ellen Cloninger
Assistant Athletic Director, Business: Kenneth A. Peterson
Assistant Athletic Director, Support Services and Head Trainer: Dale P. Mildenberger
Assistant Athletic Director, Ticketing: Louie Krutsch
Assistant Athletic Director, Media Relations: Mike Strauss
Assistant Athletic Director, Academic Services: Mark D. Nelson
Director of Marketing and Promotions: J. D. Griffith
Strength and Conditioning: Kim E. Sword
Equipment Coordinator: Mike Bair
Compliance Coordinator: Lucy Stolpe
Faculty Representative: Mike Parent

Head Coaches:
Basketball: Stew Morrill
Football: Dave Arslanian
Golf: Dan W. Roskelley
Gymnastics: Ray Corn
Soccer: Stacey Enos
Softball: Pam McCreesh
Tennis: Chris Wright
Track: Gregg B. Gensel
Volleyball: Ginny Alexander

The Intercollegiate Athletics program at Utah State University encourages excellence in academic and athletic performance. The program is designed to develop qualities of leadership, sportsmanship, and individuality, helping each student-athlete to realize his or her ultimate capabilities.

Utah State's Intercollegiate Athletics operates under the direction of the National Collegiate Athletic Association (NCAA), the Big West Conference, and Utah State University. The Aggies compete at the NCAA Division I Level in 15 sports, including football, women's soccer, women's volleyball, men's and women's cross country, men's basketball, men's and women's indoor track and field, women's gymnastics, softball, men's golf, men's and women's tennis, and men's and women's outdoor track and field.

The Aggies have a storied history, gaining national attention in recent years in a number of different sports.

In the decade of the 1990's, Utah State has claimed 20 Big West team championships.

The Utah State football program has proved to be a breeding ground for NFL talent, sending numerous players to the professional ranks in recent years. Since 1980, 38 former Aggies have seen action in the NFL, along with a number of players who have played for Canadian Football League teams.

The Aggies finished the 1997 football season claiming their third Big West Championship in the last five years and playing in the inaugural Humanitarian Bowl. Utah State defeated in-state rival Utah for the second consecutive season en route to posting a 6-5 regular season record. The Aggies have annually produced one of the most explosive offenses in the country.

USU's men's cross country team has finished first or second at the Big West Championship in six straight years, while the outdoor track team has duplicated that feat. Both programs have claimed three league titles in that time.

On the women's side, USU's cross country teams have finished in the top four of the league meet in four straight years with a runner-up finish in 1997, while the outdoor track team has claimed five straight Big West Championships.

USU's women's soccer program began competition in 1996 and showed solid improvement in its second year of existence, finishing sixth in the Big West with a very young team.

The USU volleyball program qualified for the Big West Tournament after finishing third in the eastern division of the Big West, as the team set numerous school records while finishing 17-13.

Since 1970, the USU basketball team has competed in the NCAA Tournament eight times, including during 1998, and in the National Invitational Tournament three times, including the 1995 season when the Aggies won the Big West Championship.

USU posted a 25-8 record in 1998 and won the Big West Championship. The Aggies' 72 Big West wins from 1994-98 were the most earned by any league team in that time period.

USU's gymnastics program is annually ranked among the nation's best and has sent teams to NCAA regional competition 18 times in the last 19 years and advanced to the NCAA Championship five times. The Aggies won the 1998 league championship.

The softball team competes in one of the nation's toughest leagues and has finished among the top four in that league five of the last six years, including claiming a league title in 1993. The Aggies won national championships in 1980 and 1981.

USU's golf team finished fourth at the 1997 Big West Championship, its best finish since 1981.

While Utah State claimed two team Big West Championships and three runner-up finishes in 1997, several Aggies made their mark individually. Four USU student-athletes earned athletic All-America honors, while 60 student-athletes were named to all-conference teams and 11 were individual conference champions.

In the classroom, USU produced 50 academic all-Big West honorees, while Heather Marcum, a member of the track team, picked up the Robbins Award as the entire school's Scholar-of-the-Year.

Aggies earning athletic All-America honors included Shane Bingham and Corey Murdock from men's track, and Ladonna Antoine, who earned the honor in both indoor and outdoor track.

In 1997, a school record eight football players earned first-team all-Big West honors, with 11 others garnering second-team and three others earning honorable mention all-conference accolades. Defensive end Ben Crosland was named the Big West Defensive Player-of-the-Year and earned third-team All-America honors from *The Sporting News* magazine.

USU volleyball player Denae Mohlman was named the Big West Freshman-of-the-Year and was a first-team all-conference selection as well.

Basketball player Marcus Saxon earned first-team all-Big West honors in 1997 and 1998, while Maurice Spillers was second team in 1997 and Kevin Rice was second team in 1998.

The men's track team saw Brooks Gibbons (110-hurdles), Corey Murdock (400-hurdles), Justin DeSantis (hammer), and Brian Dopp (decathlon) win Big West titles, while Ladonna Antoine (200 and 400), Becky Blackburn (high jump), Jennifer Homer (discus), and Dawn Smith (hammer) won league titles on the women's side.

Todd Tanner was the Big West runner-up in golf, earned first-team all-Big West honors, and qualified to compete in the NCAA West Regional. Four Aggie men's tennis players were academic all-Big West selections, while three women's tennis players earned those same honors.

Beth Neilson claimed a Big West championship in the bars, while she, Deanna Palmer, Kerry Griggers, and Krissy Richards were all-Big West selections.

In softball, Tammy Alcantar earned all-region honors, while being tabbed a first-team all-Big West selection. Rhealee Thorn was a second-team all-league pick.

USU has a strong history of athletic success. Among these successful athletes is Merlin Olsen, who won the Outland Trophy awarded to the nation's top lineman in 1961. Olsen, who was selected into the NFL Hall-of-Fame, was also an academic All-American. Merlin's brother, Phil, was also an athletic All-American at Utah State and had great success in the NFL. USU has produced five Olympians and 17 All-Americans in track and field, including former world record holders L. Jay Silvester and Mark Enyeart. Jay Don Blake became USU's first NCAA national champion in golf, winning the national title in 1980 and finishing second the following year.

Aggie basketball boasts the legacy of Wayne Estes, an All-American in the early 1960s before his untimely death prior to the conclusion of his senior season.

Three Aggie gymnasts have earned All-American honors and two others have represented their countries in the Olympics and World Championships. Seven different student-athletes have earned All-America honors in volleyball 12 times, and Elaine Roque and Karoly Kirby have gone on to successful careers on the pro beach volleyball tour.

The softball team has produced four All-Americans, including three-time All-American Kelly Smith.

Participation. As members of the Big West Conference, the Aggies play conference schedules in basketball, football, softball, and volleyball. The conference winner in these sports earns an automatic bid to NCAA post-season play, with the exception of football. The conference winner in football earns a berth in the Humanitarian Bowl in Boise, Idaho. In addition, conference championships are held in cross-country, golf, tennis, and outdoor track and field. The gymnastics team will contend for post-season participation via the NCAA Midwest Region Championships.

Facilities. Excellent training and competition facilities are provided in all sports.

E.L. “Dick” Romney Stadium, home of the Aggie football team for over 25 years, seats 30,257 cheering fans each week during the season. In an effort to update the facility, a state-of-the-art lighting system was installed prior to the 1993 season and chair-back seating was added ahead of the 1997 season. Future plans for Romney stadium include expanding seating capacity to 40,000 seats and the construction of a multi-storied complex at the south end of the stadium to consolidate academic support to the student-athletes. Future plans also include the expansion of the press box with the installation of two elevators.

Basketball, gymnastics, and volleyball are played in the 10,270-seat Dee Glen Smith Spectrum. Basketball and volleyball practices are held in the Spectrum, while the HPER building is the practice home for the gymnastics team. The recently renovated gymnastics practice gym has been labeled as one of the nation's finest, complete with vaulting pits and foam-spring exercise floor.

The Nelson Fieldhouse is the home of the Aggie indoor track and field teams. The teams practice on a 200-meter tartan track. The fieldhouse is also used by the softball and tennis teams for practice during late winter months. For the outdoor season, a newly resurfaced and renovated Ralph Maughan Stadium is the home for the men's and women's track teams.

The women's softball team plays its home games at Johnson Field, a new on-campus facility.

The tennis teams play on the HPER courts, while the men's golf team practices and plays at the Birch Creek Golf Course and the Logan Golf and Country Club.

Scholarships. Utah State offers partial and full scholarships in each of the 15 sponsored sports. A student or prospective student desiring consideration for one of these awards may contact one of the coaches for further information about scholarship applications.

Registration and Eligibility. Registration for athletic participation in Aggie athletics may be accomplished by contacting any of the coaches or the athletics office. Eligibility for participation is governed by the rules and regulations established by the NCAA, the Big West Conference, and by Utah State University.

Supervision. Supervision and direction for men and women is vested in the director of athletics and the Athletic Council, consisting of the president of the University, and members of the faculty, the alumni, and student organizations.

Information and Learning Resources Program

The Information and Learning Resources Program is a strategic academic service organization, whose purpose is to enhance the teaching, research, and service missions of Utah State University. In partnership with academic departments and colleges, research and service units, and administrative divisions, the Information and Learning Resources Program facilitates the University Mission through four central functions: (1) Creating and maintaining core resources, including Library and Information Services, Computing Services, and Media Services; (2) Facilitating and contributing to the development of educational programs and information systems to promote and extend active learning; (3) Establishing global access to informational, educational, research, and management resources; and (4) Providing and maintaining a University-wide Information Network to deliver voice, data, and video services in support of instruction, research, and extension to classrooms, laboratories, and off-campus facilities.

Administration

Interim Dean, Information and Learning Resources Program: Byron R. Burnham, (435) 797-1637
Budget/Personnel: Jeannie F. Simmonds, (435) 797-3166
Special Projects: Peggy P. Nixon, (435) 797-1134
Assessment: Joan Ann Kleinke, (435) 797-1776

Library and Information Services

Director: Max P. Peterson, (435) 797-2631

Associate Director of Public and Technical Services: Robert G. Murdoch, (435) 797-2631
Reference Services
Circulation Services
Government Documents
Cataloging
Acquisitions
Serials and Binding

Associate Director of Audio Visual Services: LaDell C. Hoth, (435) 797-2660
Media Distribution Services
Media Collection Development
Equipment Services

Curator, Head of Special Collections and Archives: Ann Buttars, (435) 797-2663
Manuscripts
Archives
Rare Books and Printed Matter
Fife Folklore Archive

Library Systems Manager: Michelle M. Smith, (435) 797-3977
Networks
Online Public Access Catalog
Automation Service

An extensive collection of books, periodicals, and electronic resources are represented in the library's collections. The library has been designated as a regional depository for federal documents, resulting in one of the outstanding collections in the Intermountain West. A diverse collection of local, state, and international documents is also available. Further, the library holds many specialized bibliographies, indexes, indexing and abstracting services, electronic full text, and subscription services crucial to researching needed materials.

Trained library personnel specializing in reference and documents are available to provide assistance. Through the Interlibrary Services Department, library patrons can access the collections of libraries in this country and around the world. The library is a member of the Bibliographic Center for Research, the Center of Research Libraries, and the Utah Academic Library Consortium. The Division of Special Collections and Archives contains a significant body of primary source material (manuscripts and rare books) for area studies and for all aspects of the University's history.

Multimedia and Distance Learning Services/Faculty Assistance Center for Teaching

Director: Jonathan Kadis, (435) 797-3134
Chief Engineer: Rickey D. Hughes, (435) 797-2706

Provides support to the faculty and the University through the production of various types of distance learning and instructional/informational video programs. Teleconferencing and satellite up-linking and down-linking of programs are available to enhance the educational experience, as well as instructional design consultation and complete electronic graphics support.

Publication Design and Production

Director: Jeannie F. Simmonds, (435) 797-3166
Manager, Copy Centers: Remani Rajagopal, (435) 797-2620
Manager, Printing and Operations: Dale P. Smith, (435) 797-2626

As the publication arm of the Information and Learning Resources Program, Publication Design and Production provides the campus community with expertise and service in all printing and publication areas. Duplication and electronic output are provided through seven on-campus copy centers. A full-service printing operation is available for creation of printed University publications.

Photography Service

Manager: Donna B. Horchner, (435) 797-2262

Provides support to the faculty and the University through the availability of photographers, the production of photographic prints and slides, consultation, and specialized photographic services for research and instruction.

Computer Services

Director: Karl A. Fugal, (435) 797-2412
Associate Director: Kim A. Marshall, (435) 797-2413
Office in SER 325, (435) 797-2391

The Office of Computer Services provides computing/networking facilities and services for teaching, research, student, and administrative uses. The centralized equipment provided for use by students, faculty, and staff includes an IBM ES9000 series system, a VMS Cluster of five DEC Alphas, and associated peripheral devices. More than 800 microcomputers located in 11 public labs are dedicated for student use.

Computer Services maintains network connections to the Internet. These facilities provide Worldwide Web access, super-computer access, data transfer, and electronic mail service to and from nearly every Internet location in the world. An intra-campus fiber optic data communications backbone is maintained and operated by Computer Services. Nearly all campus computers are connected via this facility. A modem pool of 191 modems provides dial-in access to the campus backbone.

A Computer Services staff of 32 permanent and 75 part-time (student) employees serves diverse user needs. Computer Services offers data entry, as well as test scoring and scanning services. Commercial computer programs for statistical data analyses, e.g., SAS, SPSS, MINITAB, and mathematical subroutines such as IMSL, are maintained, and user consultation is available.

Computer Services periodically offers short courses on computer-related skills–computer programming, using commercial programs, and using peripheral equipment.

User guides and newsletters are published and Web pages are maintained. All students are entitled to a computer account which is sufficient for meeting their yearly educational computing needs. Students pay a part of the costs to support academic computing through a fee collected at registration time.

Student Services

The University provides a number of programs and agencies to facilitate students in their educational pursuits. Related services are also provided. Students are invited to contact the following offices for information about the University, student services, and student-organized activities.

Vice President for Student Services: Patricia S. Terrell, SC 220, (435) 797-1712
- **Director, Student Publications:** Jay C. Wamsley, SC 319, (435) 797-1759

Associate Vice President for Student Services –Enrollment Services: Lynn J. Poulsen, SC 246, (435) 797-1107
- **Director of Admissions and Records/Registrar:** R. David Roos, SC 246, (435) 797-1014
- **Director, Financial Aid:** Judy LeCheminant, SC 106, (435) 797-0173
- **Graduation Office:** Janalee Johnson, SC 246, (435) 797-1117
- **Director, High School/College Relations:** Eric R. Olsen, University Inn 101, (435) 797-1129
- **Director, Office of International Students and Scholars:** Afton B. Tew, SC 313, (435) 797-1124
- **Records Office:** Elizabeth W. Allen, SC 246, (435) 797-1116
- **Residency Office:** Stanley A. Bodily, SC 246, (435) 797-0556
- **Scheduling Office:** Cindy B. Moulton, SC 246, (435) 797-1140
- **Veterans Affairs Office:** Lillian Tripp, SC 246, (435) 797-1102

Assistant Vice President for Student Life: Gary A. Chambers, SC 326, (435) 797-3137
- **Acting Director, Campus Recreation:** Deanne J. Williams, HPER 126, (435) 797-1502
- **Director, USU Children's House:** Sondra T. Moe, 862 East 900 North, (435) 797-3657
- **Director, Counseling Services:** Mary E. Doty, SC 306, (435) 797-1012
- **Director, Housing and Food Services:** Michael D. Black, 1295 East 1000 North, (435) 797-3266
- **Director, Parking and Transportation Services:** Terry K. Moore, 1151 East 700 North, (435) 797-3414
- **Director, Student Activities:** Randy Jensen, SC 326, (435) 797-3454
- **Director, Student Health Services:** James W. Davis, SC 102, (435) 797-1660
- **Director, Student Wellness Center:** JoAnn R. Autry, UI 127, (435) 797-1010
- **Director, Women's Center:** Janet L. Osborne, SC 310, (435) 797-1728

Assistant Vice President for Student Services –Academic Support Services: LaVell E. Saunders, SC 302, (435) 797-1132
- **Director, Academic Resource Center and Director, Summer Citizens:** Noelle A. Call, SC 302, (435) 797-3373
- **General Registration:** J. Rodney Clark, SC 302, (435) 797-3373
- **Director, Advising and Transition Services:** John D. Mortensen, SC 302, (435) 797-1128
- **Director, Career Services and Cooperative Education:** David F. Hart, University Inn 102H, (435) 797-7777
- **Director, Disability Resource Center:** Diane C. Baum, SC 104, (435) 797-2444
- **Director, Multicultural Student Services:** To be appointed, SC 311K, (435) 797-1733
- **Director, Student Support Services:** Nazih T. Al-Rashid, SC 225, (435) 797-3372
- **Testing Services:** Eric W. Jensen, University Inn 115, (435) 797-1004
- **Editor, Student Services:** Sheri E. Peterson, SC 104, (435) 797-2610

University Extension

Office in Agricultural Science 209, (435) 797-2200

Vice President and Dean: Robert L. Gilliland
Associate Vice President and Associate Dean: Weldon S. Sleight
Assistant to Vice President: Marlene Berger
Business Manager: Steven R. Broadbent
Director, Communications and Government Relations: Lee Roderick
Administrative Assistant, Continuing Education: Arla Swensen
Director, 4-H Youth Programs: Kevin C. Kesler
Assistant Supervisor, 4-H Youth Programs: Carla D. Lee
Extension Publications Editor: Donna Falkenborg
Bulletin Room Secretary: Karen Elwood
Staff Assistants, University Extension: Lenis Carlile, John Monson

USU Extension Regional Department Heads

Cache/Box Elder: "H" K. Hancock, Scott S. McKendrick
Weber/Davis/Morgan/Summit: Scott S. McKendrick, Terry R. Teigeler
Tooele/Salt Lake: Vincent J. Lafferty, Scott S. McKendrick
Utah/Wasatch/Juab: Steven D. Cox, Guy W. Denton
Daggett/Duchesne/Uintah/Rich: Steven D. Cox, Laird M. Hartman
Carbon/Emery/Grand/San Juan: Steven D. Cox, Steven R. Hawks
Sanpete/Beaver/Iron/Washington: Guy W. Denton, Diane J. Reese
Sevier/Millard/Piute/Wayne/Garfield/Kane: Guy W. Denton, Diane J. Reese

State and Area Program Specialists

Agronomist (Crops): Ralph E. Whitesides
Agronomist (Weeds): Steven A. Dewey
Animal Science: Robert E. Buckner, Haven B. Hendricks
Beef: Dale R. Zobell
Community Development: Stanley M. Guy, David L. Rogers
Computer Specialists: James T. Belliston, Wes James
Dairy Science: Ronald L. Boman, Glen A. Israelsen, Allen J. Young
Disabled Persons: Julia A. Burnham
Equine: Tiffany R. Julen Day
Entomology: Diane G. Alston, Ted Evans, Jay B. Karren
Extension Economists: DeeVon Bailey, E. Bruce Godfrey
Family and Human Development: Glen O. Jenson, Thomas R. Lee
Family Resource Management: Elizabeth E. Gorham
Food/Nutrition: Nedra K. Christensen, Georgia C. Lauritzen, Donald J. McMahon
Food Science: Charlotte P. Brennand, DeLoy G. Hendricks, Von T. Mendenhall
Forest Resources: Michael R. Kuhns
Horticulture: Anthony H. Hatch (Provo), Larry A. Rupp, William A. Varga (Farmington)
Housing and Home Furnishings: Leona K. Hawks
Human Resource Analyst: Marion T. Bentley
Information and Publications: Donna Falkenborg, Dennis L. Hinkamp
Irrigation: Robert W. Hill
Landscape Architecture and Environmental Planning: David L. Bell
Marketing: Donald L. Snyder
Pesticides and Toxicology: Howard M. Deer
Plant Pathology: Sherman V. Thomson
Radio-TV: Roger McEvoy
Range Management: Roger E. Banner, G. Allen Rasmussen
Soil Science and Water Use: Richard T. Koenig
Structures: Stephen E. Poe
Vegetables: Daniel T. Drost
Veterinary Science: Clell V. Bagley
Water Quality: Kitt Farrell-Poe
Wildlife Resources: Terry A. Messmer

County and Area Agents

Beaver: R. Mark Nelson, Adrie J. Roberts
Box Elder: Ann E. Henderson, Lyle Holmgren, Thomas A. Reeve
Cache: Michael D. Allred, Don Huber, Ross A. Jacobson, Kristine S. Saunders
Carbon: Ellen J. Serfustini, Marlon B. Winger
Davis: Stephen H. Jackson, Shawn H. Olsen, Lenore Robbins, JoAnn M. Ross
Duchesne: Troy D. Cooper, Barbara B. Mathis
Emery: Dennis R. Worwood
Garfield: Lucile H. Proctor, John A. Soper
Grand: Michael S. Johnson
Iron: Chad R. Reid, Kathleen Riggs
Juab: Jeffrey E. Banks, Margie P. Memmott
Kane: Julie M. Ingersoll, John A. Soper
Millard: Michael G. Pace, Joan B. Sellers
Morgan: Margaret H. Hopkin, Randy Sessions
Piute: Verl L. Bagley, Carol H. Williams
Rich: Scott R. Williams
Salt Lake: Wade B. Bitner, Earl K. Jackson, Marilyn King, N. Jean Kobayashi, Rebecca Low, Larry A. Sagers, Paula E. Scott
San Juan: James D. Keyes, Francis W. Price
Sanpete: Gary L. Anderson, JoAnn Mortensen
Sevier: C. Kim Chapman, Jody A. Gale, Clyde J. Hurst, Ann B. Parkinson, Diane J. Reese
Summit: Sterling J. Banks, Faye P. Boyer
Tooele: F. Brent Bunderson, Lee Sherry
Uintah: Boyd M. Kitchen, Ronda H. Olsen
Utah: JoLene B. Bunnell, W. Craig Burrell, Steven D. Cox, Brent L. Gledhill, Judy L. Harris, Anthony H. Hatch, Jim C. Jensen, F. Dean Miner
Wasatch: Debra G. Proctor, Val D. Warnick
Washington: David Braun, Adrian C. Hinton, Suzanne Jorgensen
Wayne: Verl L. Bagley, Carol H. Williams
Weber: James V. Barnhill, Kay L. Evans, Teresa Hunsaker, Ben L. Tueller

Extension Representatives with Colleges

Agriculture: Ralph E. Whitesides
Business: David H. Luthy
Education: Keith T. Checketts
Engineering: Alma P. Moser
Family Life: Leona K. Hawks
Humanities, Arts, and Social Sciences: David L. Rogers
Natural Resources: Charles W. Gay
Science: Kandy Baumgardner

USU Extension

Office in Agricultural Science 209, (435) 797-2200

USU Extension includes the Cooperative Extension Service and Continuing Education Programs, the latter encompassing the Conference and Institute Division, Class Division, Independent Study (correspondence home-study), evening school, and various branch campuses and centers across Utah.

Cooperative Extension Service

The Cooperative Extension Service is sponsored and financed jointly by federal, state, and county governments. There is a Cooperative Extension Service in the land grant institution of each state.

The main functions of the Cooperative Extension Service are to develop leadership, resourcefulness, and initiative; to supply factual information for discovering and solving problems; and to help people become more efficient, increase their income, improve their home and community environment, and raise their standard of living. University Extension takes the findings of research to the people of the state and brings unsolved problems back to research workers at the University.

Extension programs are planned with the people. The demonstration method of teaching and mass media are used extensively. Group meetings, short courses, and publications are used to supply educational information.

Administrative and some supervisory personnel and subject matter program leaders are located on the USU campus. In addition, a field staff consisting of district supervisors, area specialists, area agents, county agents, home economists, and program aides serve the people throughout the state.

The Extension program includes work with both adults and youth.

Major program areas are centered around (1) agriculture, (2) 4-H youth, (3) family living, (4) economic development, and (5) environmental care.

Central in the function of University Extension is problem solving at the community level. Through research provided by the departments of the University, the community becomes a laboratory in the teaching-learning process. Community problems are extremely varied and complex. Consequently, University Extension educational programs designed to benefit the community require creativity and innovation of the colleges and departments according to their areas of competency.

To carry out this function, Extension programs at Utah State University focus on the knowledge competencies from the appropriate disciplines on four broad areas of concern to people of Utah: physical environment, social environment, economic and industrial development, and education instructional services.

Continuing Education Programs

During the past two decades, faculty and administration of the University have strengthened service to residents through the development of the Continuing Education Programs, a combination of advanced educational philosophy and educational practice. Continuing Education is a growing concept in higher educational philosophy. It recognizes that learning is necessary and takes place throughout one's life, from adolescence through retirement. Continuing Education provides opportunities for professional or vocational learning, and also provides for lifelong enrichment through participation in social and cultural programs. Through such programs, persons of all ages are able to enrich their lives and increase their knowledge without disrupting their employment or lifestyle.

Kellogg Life Span Learning Complex. The W. K. Kellogg foundation and other private funding sources have made it possible to build three structures, centrally located on the campus, for Continuing Education Programs. The five-story University Inn is located in an area between the Taggart Student Center and the Agricultural Science Building. The 53,079 square foot, five-story facility contains 74 modern hotel rooms, two of which are suites, to house those who visit campus for a variety of programs.

The 39,143 square foot, three-story Conference Center is located between the Agricultural Science Building and the Merrill Library. The spacious conference meeting rooms overlook the beautiful quad area near the intersection of the two major malls serving the campus. The facilities feature satellite uplink and downlink capabilities, internet access in all meeting rooms, and state-of-the-art audiovisual presentation equipment. The conference facilities include twelve meeting rooms ranging from a 400-seat auditorium to small seminar rooms for 10 to 30 people. Administrative offices for Continuing Education Programs are also located in the Conference Center. Individuals and groups of all ages are encouraged to investigate this expanded resource of Utah State University as a means of pursuing their unique educational goals.

Conference Services. The responsibility for conferences, short courses, symposiums, seminars, and institutes is vested in the Conference Services Office. The role of this office is to promote, coordinate, and administer conference programs in cooperation with faculty members of the various campus organizations and with individuals and groups outside the University.

There are no limitations in terms of age or educational background on the clientele to be served through the Conference Services Office. All that is required is a desire to learn. The scope of the program will be as broad as available knowledge resources will permit.

Continuing learners may participate in educational activities for a variety of justifiable reasons, all of which relate to recognized needs for self-improvement, an appetite for intellectual stimulation through social interaction, or simply a desire to learn.

Degree Programs

A large number of people living in communities or areas remote from the University campus desire to benefit from university training but cannot come to Logan to register for resident courses. For this group, courses are made available to approximately 50 different communities of the state through on-site faculty, through visiting faculty, and via an interactive telecommunications system using digital satellite technology. In addition, some courses are available on the internet, and others will be added. Such courses are offered by the respective academic departments. Off-campus credit courses are equivalent in content hours of class instruction and preparation, and otherwise meet the same prerequisites as comparable classes offered on the University campus.

Classes may meet the requirements for a bachelor's degree, as determined by the individual departments and colleges. They also may meet the requirements for a master's degree with approval of the School of Graduate Studies.

All instructors in class division courses are either members of the regular University teaching faculty officially assigned to the teaching project concerned or nonresident members approved by the head of the department and by the college administration.

The registration fees charged for classes conform to regulations of the Board of Regents. Fees may not be less than the on-campus tuition and may be more if warranted by the additional expense of conducting the class off campus.

Independent Study

Many individuals desire organized, systematic instruction but live in isolated areas, or for other reasons cannot meet for class instruction on the University campus or its resident centers. For such individuals, USU provides a liberal offering through a wide variety of Independent Study courses in many departments of the University. This program furnishes an excellent opportunity to students of high school or college level and to adults who desire general education and professional improvement in selected fields.

For admission to Independent Study courses, an enrollee must be at least 19 years of age or a high school graduate, or must submit 15 credits of high school work.

High school students demonstrating superior ability may enroll for University credit courses.

As many as one-fourth of the credits necessary for a bachelor's degree may be earned by completing Independent Study courses (30 semester credits). Each college of the University, subject to faculty approval, determines the nature and amount of Independent Study credit accepted for admission and graduation. In no case is Independent Study credit to comprise more than 25 percent of the total number of credits accepted for graduation. Independent Study courses are **not** accepted for graduate degrees.

Independent Study Catalog. Anyone interested in Independent Study may request a catalog containing complete information concerning this program by writing to Independent and Distance Education, Utah State University, 3080 Old Main Hill, Logan UT 84322-3080, or phone (435) 797-2137.

Evening School

The Evening School provides a source of continuing education for those students unable to attend classes during the day. The classes and faculty are the same, and the credit is the same as if it were earned during the day.

As a convenience to students, coursework has been combined into one class period per week. For example: students can take a three-credit course one evening a week, or one class Friday evening and one Saturday morning as part of the weekend college concept.

Further information can be obtained by contacting the Evening School staff in room 102 of the Eccles Conference Center or by calling (435) 797-2075.

Continuing Education Centers

For the convenience of people living in other areas of the state, USU has established the following Continuing Education Centers:

Brigham City Branch Campus: "H" K Hancock, Director; 275 W 1100 S, Brigham City UT 84302; tel. (435) 734-2277 or (435) 797-1784; FAX (435) 797-3943.

Ogden Center for Graduate Studies: Terry R. Teigeler, Director; Ogden City Mall, SE Corner Basement, Ogden UT 84401; tel. (801) 621-5861 or (435) 797-2590; FAX (801) 394-6939.

Tooele Branch Campus: Vince J. Lafferty, Director; 1021 W Vine, Tooele UT 84074; tel. (435) 882-6611 or (435) 797-3606; FAX (435) 882-7916.

Salt Lake Center for Graduate Programs: Vince J. Lafferty, Director; 1018 W Atherton Dr #A202, Murray UT 84123; tel. (801) 269-9422 or (435) 797-2077; FAX (801) 266-7907.

Southwest Utah Education Center: Guy W. Denton, Director; c/o Snow College Outreach, West Campus; 345 W 100 N, Ephraim UT 84627; tel. (435) 283-5663 or (435) 797-2608; FAX (435) 283-5648.

Uintah Basin Branch Campus (Roosevelt and Vernal): Laird M. Hartman, Director; 987 E Lagoon (124-9), Roosevelt UT 84066; tel. (435) 722-2294; FAX (435) 722-3931.

Southeast Utah Center for Continuing Education (Moab, Price, Blanding): Steven R. Hawks, Director; 125 W 200 S, Moab UT 84532; tel. (435) 259-7432; FAX (435) 259-8423.

University Research

Vice President for Research: Peter F. Gerity
Office in Main 159, (435) 797-1180
Associate Vice President for Research: H. Paul Rasmussen
Office in Agricultural Science 225, (435) 797-2207
Associate Vice President: M. K. Jeppesen
Office in Main 159, (435) 797-1227

Research Programs

Utah Agricultural Experiment Station: Director H. Paul Rasmussen
Engineering Experiment Station: Director Alma P. Moser
Utah Center for Water Resources Research: Director Ronald C. Sims
Utah Water Research Laboratory: Director Ronald C. Sims
Ecology Center: Director Martyn M. Caldwell
Laboratory Animal Research Center: Director Stanley D. Allen
Center for Atmospheric and Space Sciences: Director Robert W. Schunk
Utah State University Research Foundation: President and CEO Allan J. Steed
Center for Persons with Disabilities (CPD): Director Marvin G. Fifield
Bureau of Research Services, College of Education: Associate Dean Ron J. Thorkildsen

Institute of Political Economy: Director Randy T. Simmons
Economics Research Institute: Director Kenneth S. Lyon
Institute for Land Rehabilitation: Interim Director John C. Malechek

Cache County Study in Memory and Aging: Principal Investigator Dr. John C. S. Breitner, Johns Hopkins University; **Co-Principal Investigator** Bonita W. Wyse, Dean, College of Family Life

Federal Interagency Natural Resources and Environmental Analysis and Synthesis Center: Director John A. Kadlec, Interim Dean
Utah Division, UCAN (UT, CO, AZ, NM) Consortium: Director Carolyn G. Barcus
Utah Hip Fracture Study: Principal Investigator Ronald G. Munger; **Co-Principal Investigator** Nancy E. Sassano
Geographical Information Systems Remote Sensing Lab: Interim Director R. Douglas Ramsey

Research Supporting Activity

Contract and Grant Office: Director Michael R. Lewis

Research Committees

University Research Council: Chairman Peter F. Gerity
University Safety Committee: Chairman David B. Drown
Radiological Safety Committee: Chairman Paul A. Wheeler
Committee on Experimental Animals: Chairman Stanley D. Allen
Committee on Human Subjects: Chairman Brent C. Miller
Institutional Biosafety (RDNA) Committee: Chairman John D. Morrey
Indirect Cost Waiver Committee: Secretary M. Kay Jeppesen
Biohazards Committee: Chairman Robert W. Sidwell
Chemical Hygiene Committee: Chairman Howard M. Deer
State Arboretum at Utah State University: Mary E. Barkworth

Cooperative Research Units

Utah Cooperative Fish and Wildlife Research Unit: John A. Bissonette
USDA Forestry Sciences Laboratory: Raymond W. Brown

USU was among the first of the colleges and universities in the intermountain area to have a research program. Originally research was principally in agriculture. Now research projects span every college and virtually all departments of the University.

Research is closely associated with teaching and student laboratory activities. Most research is conducted by faculty and staff members who are actively involved in teaching.

Many graduate and undergraduate students are employed to assist in research. The experience thus gained by students is an important part of their education.

Research affiliated with the University is under the general administration of the Vice President for Research. Actual research operations are conducted in colleges and departments and within the research units designated above.

Research stipends are available for many graduate students within the several colleges and research units. Opportunities exist for multidisciplinary programs through such units as the Ecology Center, the Center for Atmospheric and Space Sciences, the Utah Agricultural Experiment Station, the Institute for Land Rehabilitation, the Center for Biotechnology, and the Center for Water Resources Research. There are numerous well-equipped laboratories such as the Utah Water Research Laboratory, the Space Dynamics Laboratory, the MS/GIS Laboratory, the Center for Persons with Disabilities, the many facilities of the Utah Agricultural Experiment Station, and in Biology and Natural Resources.

Policies on research are reviewed by the University Research Council. Present members of the council and the area each represents are: Peter F. Gerity, chairman; G. Jay Gogue, Provost; Rodney J. Brown, Agriculture; H. Paul Rasmussen, Utah Agricultural Experiment Station; F. E. “Fee” Busby, Natural Resources; David B. Stephens, Business; James A. MacMahon, Science; Gerard R. Giordano, Education; A. Bruce Bishop, Engineering; Stan L. Albrecht, Humanities, Arts and Social Sciences; James P. Shaver, School of Graduate Studies; Bonita W. Wyse, Family Life; Ronald C. Sims, Utah Water Research Laboratory; Dennis L. Welker, Faculty Senate; and two student members.

The Office of

University Research

Vice President for Research: Peter F. Gerity
Office in Main 159

The policy of the University is to encourage and support research and all forms of creative, scholarly activities by faculty and staff members. Much of the research is supported by funds directly assigned to various administrative units of the University. Unrestricted funds for general support of research are administered through the Research Office.

The Research Office serves as a coordinating center for all research associated with the University. General policies and procedures pertaining to research and the promotion of a coordinated research program are the responsibility of the University Research Council.

Agricultural Experiment Station

Director: H. Paul Rasmussen
Office in Agricultural Science 225

The Agricultural Experiment Station, a major division of the University, was established in 1888 when the territorial legislature passed a bill creating Utah Agricultural College and Utah Agricultural Experiment Station. It is commissioned by state and federal legislative acts to conduct research needed to conserve and manage natural resources; to produce, prepare, and market food and fiber; and to develop and improve rural living.

The Experiment Station fulfills its responsibilities with more than 130 full- or part-time professional staff members located in 14 departments of the University. The staff includes about 35 employees of the U.S. Department of Agriculture who collaborate in agricultural research activities. A large number of undergraduate and graduate students are employed on a part-time basis to assist with research.

Experiment Station investigations include more than 200 research projects, ranging from applied field tests to fundamental research under controlled laboratory conditions.

Experiment Station research is periodically reviewed by advisory committees representing all agricultural industries. These committees evaluate the research progress and recommend areas for further study.

Most of the research facilities of the Experiment Station are on the USU campus in various University buildings. In addition, the Experiment Station operates other farms and associated research facilities throughout the state. Field tests and studies of industries and communities are conducted on a short-term basis at more than 100 other locations each year.

Engineering Experiment Station

Director: Alma P. Moser
Office in Engineering Class EC 110

The Engineering Experiment Station, as part of the College of Engineering, has the broad purpose of furthering engineering sciences; engineering research, design, and development; and engineering education. The station was established in 1918 and is financed by federal, state, and industrial grants.

The director of the Engineering Experiment Station, the engineering department heads, and the individual faculty members share the responsibility to develop engineering research programs to advance knowledge and to serve the needs of the state and the nation. Interdisciplinary programs are encouraged. Financial support and professional training for graduate and undergraduate students are provided in the research programs.

Faculty members with similar and complementary talents have organized into working groups which appropriately identify their areas of research. The mutual stimulation and organizational visibility thus achieved aids in mounting effective attacks on engineering problems encountered by the state and nation. Some of the recent areas of research in the Engineering Experiment Station include irrigation and water management, toxic and hazardous wastes management, solid waste compression, risk assessment, transportation, structural systems, geotechnical analysis and buried structures, CAD/CAM, robotics and automation, thermal and cryogenic systems, image processing and compression, computer networking, parallel computing, neural networks, and virtual reality.

Utah Center for Water Resources Research (UCWRR)

Director: Ronald C. Sims
Associate Director: Upmanu Lall
Administrative Assistant: Jan S. Urroz
Council Members: A. Bruce Bishop, Chair; Stan L. Albrecht, Rodney J. Brown, F. E. "Fee" Busby, Peter F. Gerity, James A. MacMahon, H. Paul Rasmussen, Frederic H. Wagner
Office in Utah Water Research Laboratory

Purposes of the Utah Center for Water Resources Research are to (1) foster interdepartmental research and educational programs in water resources, (2) administer the State Water Research Institute Program funded through the U.S. Geological Survey at USU for the State of Utah, and (3) provide University-wide coordination of water resources research.

The governing body for the Utah Center for Water Resources Research is a council composed of the deans of the Colleges of Agriculture, Engineering, Natural Resources, Science, and Humanities, Arts and Social Sciences; directors of the Utah Agricultural Experiment Station, Utah Water Research Laboratory, and Ecology Center; and vice president for research.

All University faculty engaged in water resources education or research are considered associates of the center. The center promotes and coordinates the development of research and instructional programs that will further the training of water resource scientists and engineers. It maintains liaison relationships with appropriate state, national, and international organizations and agencies having similar objectives.

Utah Water Research Laboratory (UWRL)

Director: Ronald C. Sims
Associate Director: Upmanu Lall
Administrative Associate Director: Steven H. Iverson
Administrative Assistant: Jan S. Urroz

The Utah Water Research Laboratory houses one of the finest facilities in the country for research in groundwater, hydraulics, environmental engineering, hazardous waste management, water resources, and hydrology. Campus-wide interactions give all of these programs a strong interdisciplinary flavor that few other programs can match. The building provides more than 102,000 square feet of research space that is intensively used for a wide variety of studies. The faculty, students, and technical support personnel connected formally or informally with the laboratory (totaling approximately 175 individuals working on over 120 projects during the 1997 fiscal year) provide and train a breadth and depth of expertise important for water resources management in the state, nation, and world.

Facilities. The hydraulic testing utilizes flows up to 180 cfs on model studies served by a variety of flumes, channels, pumps, pipelines, weighing tanks, and supporting instrumentation. Environmental research is served by gas chromatographs, high pressure liquid chromatographs, a gas chromatograph/mass spectrophotometer, an ion chromatograph, liquid scintillation counters, an atomic absorption spectrophotometer, an inductively coupled plasma emission spectrophotometer, and microscopy, bioassay, Ames test, and toxicity testing capabilities.

Program and Staff. The laboratory serves as a research arm to state and local agencies with water and environmental problems, and it conducts research on a wide variety of topics affecting agricultural, municipal, industrial, and recreational users of water. Both basic and applied research are joined in practical problem solving.

A diversified staff of internationally recognized experts conducts multidisciplinary studies in surface and groundwater management. The expert teams draw from engineering, chemistry, biology, meteorology, sociology, economics, political science, forestry, fisheries, and other fields. The research program addresses hazardous waste management, groundwater development, water supply, on-site wastewater treatment, water resources planning at the river basin scale, cavitation, flow transients, hydraulic structure design, use of satellite data in hydrologic analysis, risk-benefit assessment, dam safety, effects of climate change, and water education in public schools.

Academic and Research Liaison. Research at UWRL is closely linked to academic programs through graduate research and joint appointments for professorial staff who have teaching assignments in academic departments, including the Civil and Environmental Engineering Department and the Biology Department.

UWRL assistantships help students financially and academically. The "tutorial" relationship between student and professor develops experience in research methods and introduces fresh new ideas about real world problems into the formal training programs of water scientists and engineers. During the 1997 fiscal year, more than 40 graduate students received research assistantships and made important contributions to the science and practice of water resources and environmental quality management.

Center for Atmospheric and Space Sciences

Director: Robert W. Schunk
Office in SER 246
Dean of Science: James A. MacMahon

The Center for Atmospheric and Space Sciences is recognized both nationally and internationally for its research programs. Through this interdisciplinary center, research is conducted by faculty and student teams in many widely varied areas of atmospheric and space sciences and associated disciplines.

The capabilities and strengths of the USU atmospheric and space research program have been repeatedly demonstrated through the completion of many successful research programs.

Since 1970, USU has launched more than ninety rocket-borne payloads, more than eight high-altitude balloon-borne payloads, and participated in many aircraft-borne research programs. The instrumentation included on these vehicles has ranged from simple experiments aboard small meteorological-type vehicles to large, complex, recoverable payloads designed expressly for comprehensive studies of atmospheric and ionospheric parameters. In addition, various individuals have participated in ESA and NASA spacecraft programs. Ground-based research is based on lidar observations of the middle atmosphere from the Atmospheric Lidar Observatory (on campus), optical and other observations of the middle and upper atmosphere from USU's Bear Lake Observatory (40 miles from campus), and observations of the middle and upper atmosphere, including the ionosphere, at most of the U.S. chain of incoherent-scatter radars (Sondrestrom, Millstone Hill, Arecibo, Jicamarca). Also, studies of low-latitude ionospheric electrodynamics using incoherent scatter radars, satellites, and Fabry-Perot measurements have been conducted. An extensive theoretical/modeling program is currently active in CASS. Large-scale three-dimensional numerical models have been developed to describe the ionosphere, the atmosphere, the plasmasphere, and the polar wind. Space contamination models describing the environment around space vehicles have been developed. In addition, particle-in-cell (PIC) simulation codes are being used to study plasma expansion processes, contact potentials, electron-beam plasma interactions, shocks, nonlinear wave-particle and wave-wave coupling, and several auroral plasma physics problems.

Undergraduate and graduate students are currently involved in numerous research projects in CASS that provide opportunities to program computers, analyze data, build instrumentation, and operate state-of-the-art instruments. Students are encouraged to actively participate in solving research-related problems, where they can receive valuable exposure to scientific programs as well as “hands-on” experience in research while they pursue degrees. Research assistantships are available to both undergraduate and graduate students (PhD and master's level) under the direction of faculty members associated with the center. Degrees related to research work are awarded by the associated departments, including: Chemistry and Biochemistry, Electrical and Computer Engineering, Physics, and Plants, Soils, and Biometeorology.

Utah State University Research Foundation

Chairman of the Board of Trustees: David G. Norton
President and CEO: Allan J. Steed
Executive Vice President: Frank J. Redd
Vice President: Doran J. Baker
Vice President: M. Kay Jeppesen
Vice President: Gene L. Mortensen

Space Dynamics Laboratory

Division Directors of the Space Dynamics Laboratory:

Systems Division: David A. Burt
Science Division: James C. Ulwick
Computational Sciences Division: J. Steven Hansen

Utah State University's Space Dynamics Laboratory is recognized as one of the nation's unique and vital resources in space research, conducting programs that are primarily directed toward increasing humanity's understanding of the nature of earth and space. These programs present faculty and students with unparalleled opportunities for exciting, intellectual, and hands-on engineering and science challenges in state-of-the-art space research in conjunction with their academic work.

Areas of expertise at the Space Dynamics Laboratory include conception and design of cryogenically-cooled infrared sensors; engineering of active and passive instrumentation systems for operation aboard rockets, satellites, and aircraft; calibration of space sensors; modeling of the dynamics of the planetary atmospheres; measurement of outer space phenomena; processing and analysis of spectrally- and spatially-imaged, remotely-sensed data; and cooperative around-the-globe observation programs with visiting faculty/student scientific teams at remote sites and at USU's Bear Lake Observatory.

The Space Dynamics Laboratory (SDL) comprises three divisions: the Systems Division, the Science Division, and the Computational Sciences Division. The divisions cooperate to fulfull the objectives of the research programs conducted at SDL.

The Systems Division is primarily an engineering, development, and applications organization for space qualified instruments, systems, and payloads. The division maintains design, fabrication, testing, calibration, and field support capabilities. Program management, subcontracting, and coordination are also important activities of the Systems Division.

The Science Division is oriented more directly to basic phenomenology research and fundamental understanding of processes. Fast-turnaround programs involving instrumented sounding rockets and science observations from remote field sites, aircraft, and balloons are the tools for gathering data to accomplish this research.

The Computational Science Division (CSD) was established to create a center for large-scale data processing and performance analysis for one of SDL's space-based sensors. CSD has since expanded its expertise in sensor simulation, image processing, data visualization and animation, high-speed scalable hardware configuration, database technology, and other areas requiring complex computer control. By seeking opportunities to address the growing need for innovative data analysis solutions, CSD seeks to advance the state of the art in scientific computing.

Every year, SDL places dozens of undergraduate and graduate students in assistantships involving them in cooperative exchanges with industry, government, and educational institutions.

Technical Research Laboratory

Director: Gene L. Mortensen

The Technical Research Laboratory strives to promote Utah State University as an educational and research center. Through the auspices of the laboratory, the faculty, staff, and students of Utah State University can extend their educational and research expertise to serve as facilitator to private enterprise, government, and the community. Its unique relationship with Utah State University allows it to use facilities, equipment, and personnel to enter into and administer special contracts for research, educational programs, and technical and scientific services.

The laboratory assists individuals and groups at Utah State University in the development and expansion of research, instructional, and service programs supplemental to, and integrated with, the present activities of the University. It provides an outlet for faculty consulting and an opportunity for graduate and undergraduate student interface with other universities, governmental agencies, and private industry.

Areas of emphasis include testing and modeling, environmental feasibility and assessment studies, surveys, product development, manufacturing, marketing, and contracting for services.

Utah Research Institute

Director: To be appointed

Utah Research Institute (URI) is chartered as a nonprofit consortium of Utah's four major institutions of higher learning. URI identifies and mobilizes resources and implements cooperative efforts among institutions to solve technical problems for industry.

Center for Persons with Disabilities

Director: Marvin G. Fifield

Office in Center for Persons with Disabilities 120

The Utah State University-affiliated Center for Persons with Disabilities (CPD) is one of approximately 60 such centers located in major universities throughout the United States. The mission of the CPD is to improve the quality of life of persons with disabilities by (1) providing interdisciplinary training to personnel needed to provide the broad spectrum of services for individuals with disabilities; (2) demonstrating exemplary service and delivery systems, especially in rural and remote areas; (3) conducting research projects which will provide additional knowledge and application of materials, strategies, and techniques for people with developmental disabilities; and (4) providing technical assistance and training to the various service agencies to expand and improve the quality of service that they provide.

The CPD is located on the University campus in a facility constructed specifically for the program. Training and service activities are undertaken not only on campus, but in several affiliated service centers in Utah, the Navajo Reservation, and other community-based sites throughout the nation.

The faculty and staff of the CPD consist of specialists from a variety of disciplines, including special education, psychology, biology, social work, medicine, instructional technology, early education, and vocational rehabilitation. Students come to the center from a variety of University academic departments, and the center provides supplemental coursework, research, practicum, internships, and research assistantships to prepare students to better meet the needs of individuals with disabilities.

The center reports through the College of Education and is governed by a Board of Directors appointed by the University President. The program is organized into seven divisions: Exemplary Services, Interdisciplinary Training, Outreach and Development, Biomedical Research and Service, Research and Evaluation, Technical Assistance, and Technology. The center employs approximately 140 professional and classified employees in its many training, research, and service projects. People with disabilities (infants through adults) are served directly through home and community-based service programs, and training is provided to more than 600 University students each year. Over 3,000 employees of service agencies in the state and region receive in-service training through workshops and seminars provided by the CPD each year.

Major research activities include: (1) the application of technology to improve service programs; (2) early intervention research for preschool and at-risk children; (3) the effects of the immune system on autism; (4) development of staff training programs utilizing CD ROMs and distance-learning technology; and (5) design and development of assistive technology devices and services.

Bureau of Research Services, College of Education

Chairman: Ron J. Thorkildsen

Office in Emma Eccles Jones Education 453

The College of Education's Bureau of Research Services (1) provides research assistance to faculty and graduate students in the College of Education, (2) assists faculty and students in locating off-campus funding for projects, (3) assists faculty and students in preparing research and other program proposals, (4) advises the dean and departments on research matters, (5) conducts faculty development workshops and symposia, and (6) represents the college on research-related committees.

Institute of Political Economy

Director: Randy T. Simmons

Administrative Director: Roberta Q. Herzberg

Office in Main 342F

The purpose of the Institute of Political Economy at Utah State University is to promote a greater understanding of the foundations of a free society. Most of the funding is from private individuals, corporations, and foundations.

The activities are organized around three main programs—the environmental program, the health care program, and the philosophy program. The environmental program is based on the belief that property rights and targeted liability are far more effective than standard government command and control programs. Under the health care program, the Institute is organizing research programs to study health care policy and innovative programs in Utah. The Institute is also greatly involved in the public education process for health care reform. The philosophy program develops the moral and ethical considerations behind free people and free markets.

Economics Research Institute

Director: Kenneth S. Lyon

Office in Business 610

The Economics Research Institute promotes and coordinates research on economic and related problems. The institute serves as a clearinghouse for ideas and methods related to research. Seminars and conferences stimulate faculty and student interest. Members of the Department of Economics and others who work in affiliated areas coordinate their work through the institute and receive assistance in planning research and in seeking financial support from agencies interested in their areas of research. A research study papers series is produced by the institute reporting on research, conferences, and seminars sponsored by the institute.

Ecology Center

Director: Martyn M. Caldwell

Office in Natural Resources 314C

The function of the Ecology Center is to promote and coordinate research and graduate study in the science of ecology, and to provide professional ecological advice to decision makers. Its participating faculty members hold tenure in the Colleges of Agriculture, Natural Resources, and Science, and the Departments of Biology; Fisheries and Wildlife; Forest Resources; Geography and Earth Resources; Geology; Plants, Soils, and Biometeorology; and Rangeland Resources.

Development of the Ecology Center recognizes that ecology is a multidisciplinary field, requiring the coordination of biological and physical sciences. The objectives of the center are to (1) promote and support ecological research; (2) coordinate course instruction and graduate education in ecology; (3) provide an interdisciplinary focus for graduate majors in ecology; and (4) provide information and professional ecological advice for decision makers in areas affecting the environment.

About 70 faculty members actively associate with the Ecology Center by participating in some aspect of ecological research or training. Although research and instruction take place in a number of states and foreign countries, the northern third of Utah provides the proximal outdoor laboratory. This includes such facilities as the Bear Lake Biological Laboratory, the USU School Forest and its supporting facilities, the Green Canyon Ecology Station, the Logan River Biology Laboratories, and the Snowville Ecology Station. It embraces a wide variety of habitat types ranging from the alpine zone to salt desert, and both aquatic and terrestrial systems.

Utah Cooperative

Fish and Wildlife Research Unit

Leader: John A. Bissonette
Assistant Leader Wildlife: Thomas C. Edwards, Jr.
Assistant Leader Fisheries: David A. Beauchamp
Office in Natural Resources 115

The Utah Cooperative Wildlife Research Unit was initiated in 1935 through a memorandum of understanding among the University, Utah Division of Wildlife Resources, Wildlife Management Institute, and the USDA Bureau of Biological Survey (now part of the U.S. Fish and Wildlife Service) and was one of the first ten wildlife units established in the U.S. The Utah Cooperative Fishery Research Unit was established at USU in December of 1961, the first of 25 such units in the United States. In December of 1984, the two units were combined through a memorandum of understanding among all cooperators. In November 1993, the unit became part of the U.S. National Biological Survey, which became the U.S. National Biological Service (NBS) in January 1995. In October 1996, the NBS was transferred to the U.S. Geological Survey as the Biological Resources Division (BRD). A coordinating committee, composed of representatives from the Department of Fisheries and Wildlife, BRD, the Wildlife Management Institute, and Utah State Division of Wildlife Resources, provides general guidance on the research program.

The unit's objectives are to (1) conduct research basic to proper utilization of fish and wildlife resources; (2) educate graduate students in fish and wildlife ecology and management; (3) promote fish and wildlife education through demonstration, lecture, and publication; and (4) make results of investigations available to cooperators and the public by way of peer reviewed publications, reports, popular articles, and workshops.

At the present time the fishery research program emphasis is on (1) the role of predators in structuring aquatic food webs, (2) responses of fish populations to alterations of the aquatic environment, (3) behavior and habitat requirements of fish and aquatic invertebrates, and (4) threatened and endangered species.

Wildlife emphasis is in wildlife management; conservation biology; landscape ecology; responses of vertebrate populations to environmental perturbation; habitat requirements of nongame and threatened and endangered species; and conservation education. In addition to the regular cooperators, funding is obtained from other state conservation agencies, as well as from U.S. government bureaus and departments.

Institute for

Land Rehabilitation

Interim Director: John C. Malechek
Office in Natural Resources 210

The Institute for Land Rehabilitation (ILR) promotes education, research, and regional and campus-wide communication on land rehabilitation and restoration problems. The scope of the ILR includes watershed restoration and management, wetland and riparian area management, postburning rehabilitation, mined land reclamation, and other land restoration and rehabilitation activities.

The ILR works to increase interest in land restoration and rehabilitation and promotes research by University faculty. The ILR is also an information source to agency personnel and consultants throughout the West. To further achieve its objectives, the ILR sponsors and co-sponsors workshops, symposia, and shortcourses with regional participation.

The ILR resides in the Department of Rangeland Resources, College of Natural Resources.

USDA Forestry Sciences Laboratory

Office in Forestry Sciences Laboratory

The Forestry Sciences Laboratory is a research branch of the USDA Forest Service. At Utah State University, it is comprised of a Reclamation of Disturbed Lands Research Unit, a Mountain Pine Beetle Population Dynamics Research Unit, a Statistical Unit, personnel attached to the Forest Service Washington Office, and graduate students. A support unit containing a business manager and clerical personnel is housed at the laboratory to handle all of the business management activities.

General objectives at the laboratory are to perform research relevant to disturbed land reclamation, erosion and water quality, plant/environmental relationships, detection of ecosystem changes, and mountain pine beetle population dynamics. Specific research includes studies in hydrology, plant physiology, forest pest dynamics, cumulative watershed effects, ecological succession, revegetation, and soil and water chemistry. In addition, research includes estimation of plant, animal, and human diversity and density; study design; and power analyses.

The professional fields represented at the laboratory at Utah State University include plant physiologists, entomologists, ecologists, hydrologists, mathematical statisticians, and soil scientists.

State Arboretum at Utah State University

In 1961 the Utah State Legislature officially designated Utah State University as a state arboretum. The arboretum covers the entire campus and contains more than 3,000 trees. The arboretum also contains a collection of native and adapted plants located north of Old Main Hill and a native plant demonstration garden between the wings of the Edith Bowen Laboratory School. Various shrub species and colorful displays of bulbs, annuals, and perennials provide additional beauty as well as interest to the campus.

The campus arboretum is maintained by the Landscape Operations and Maintenance Department in cooperation with Campus Planning and Engineering. The tree removal policy states that when removals occur, trees shall be replaced on at least a one-to-one ratio to maintain the integrity of the campus forest. When a tree is removed from an established landscape area, the same species of tree shall be replanted at the removal site whenever possible to preserve the original design intent. When replacement on the same site is unfeasible, a replacement tree will be planted at another suitable campus location.

The USU campus serves as an educational resource for

teaching programs of the University and the community at large. Students studying biology, horticulture, agronomy, forestry, and landscape architecture utilize the arboretum year-round to further develop a knowledge and appreciation for plants in the landscape.

Institute for Social Science Research on Natural Resources

Leader: Richard S. Krannich
Office in Main 216G

The Institute for Social Science Research on Natural Resources is a research unit established to facilitate and promote faculty and student research on a wide variety of social science research topics pertaining to the interrelations between human social systems and natural resource systems. Examples of recent and ongoing projects involving affiliated faculty and student researchers include studies of the social impacts of large-scale energy resource developments; social and cultural consequences of nuclear and hazardous waste storage; community responses to a transfer of water resources from agricultural to industrial use; social factors influencing earthquake preparedness and response; social impacts of severe sustained drought; public perceptions and attitudes toward wildlife resources; the association between environmental factors and population movements; environmental equity issues and the social distribution of environmental hazards; and trends in public environmental concern. Although the institute is housed within the Department of Sociology, Social Work and Anthropology, its goal is to encourage multidisciplinary research on human aspects of natural resource issues involving faculty and students from across the University.

Biotechnology Center

Director: William H. Scouten
Office in Biotechnology 105

The Biotechnology Center, created in 1986 as a Center of Excellence for the State of Utah, is a multidisciplinary unit of the Utah Agricultural Experiment Station. Its role is to support the development of biotechnology in teaching, research, and technology development and transfer. Center programs include education and outreach, service laboratories for biotechnology research, and support for research in agriculture, food processing and safety, animal genetics, and the environment.

Education and outreach programs provide training and technical information to researchers, extension agents, high school teachers, government agencies, and the general public. Workshops are conducted for training in research techniques and teaching methods. The center offers three laboratory-intensive courses for undergraduate and graduate students. These are Methods in Biotechnology: Cell Culture; Protein Purification Techniques; and Molecular Cloning.

Service laboratories provide essential biotechnology services, including DNA sequencing, protein sequencing, protein purification, peptide synthesis, monoclonal and polyclonal antibody production, immunoassay development, fermentation, and databases for analyses.

The center also supports programs for faculty. These include grants for innovative biotechnology research projects, funding for new biotechnology faculty positions, molecular biology fellowships, and seminars.

The Biotechnology Building houses the center and research laboratories. The research laboratories are staffed by faculty and their students who are performing biotechnology research. The faculty have their academic appointments in any of the various University departments.

International Programs and Studies

Director, International Programs and Studies: Morris D. Whitaker
Associate Director: James H. Thomas
Office in Military Science 216, (435) 797-1840

Director, International Irrigation Center: Humberto L. Yap-Salinas
Director, College of Agriculture: James H. Thomas
Director, Institute for International Rural and Community Development: Brad W. Parlin
Director, Center for International Studies: R. Edward Glatfelter
Coordinator, College of Business: Gary B. Hansen
Coordinator, College of Education: Keith T. Checketts
Coordinators, College of Engineering: Loren R. Anderson, Alma P. Moser, Wynn R. Walker
Coordinator, College of Family Life: Paul A. Savello
Coordinator, College of Humanities, Arts and Social Sciences: Pamela J. Riley (coordinator for Women in Development)
Coordinators, College of Natural Resources: Charles W. Gay, Derrick J. Thom
Coordinator, College of Science: Scott R. Cannon
Coordinator, Learning Resources Program: Byron R. Burnham
Coordinator, University Extension: Weldon S. Sleight

Utah State University is one of the institutions of the federal system of land grant colleges in the United States. Much of its experience and development has made it a leader in the areas associated with arid and irrigated agriculture, forestry, range, plant, and animal science.

The University is recognized for its expertise, both nationally and internationally. In addition to its functions of teaching, research, and dissemination of information, staff members have been and are presently involved as consultants to private industry, land development corporations, fertilizer companies, private consulting firms, government agencies, and research groups, both at home and abroad.

Utah State University has a history of involvement in international programs dating back to the early 1930s. University personnel have worked in development programs in many of the developing nations of the world. In recent years Utah State University has worked in Armenia, Bangladesh, Bolivia, Brazil, Cameroon, Cape Verde, Colombia, Ecuador, Egypt, El Salvador, Gambia, Honduras, Iran, Kenya, Morocco, Peru, Senegal,

Somalia, Sudan, Tanzania, Upper Volta, and Venezuela. Current involvement includes: China, Ecuador, Egypt, Ethiopia, India, Kazakhstan, Kenya, Mexico, Morocco, Pakistan, Panama, Russia, Senegal, Taiwan, and Thailand.

USAID/FAO/USU Foreign Participant Training

Coordinator: Pamela K. Neilson

USU cooperates with FAO and USAID, as well as with other sponsoring agencies, to develop special academic and practical programs for foreign students nominated by these agencies.

For those foreign students who come to Utah State University under auspices of a sponsoring agency requiring Utah State University to provide administrative arrangements not provided to other students, an administrative fee is charged (currently $250 per semester).

BMDO/USU-SDL Russian-American Observational Satellite

Coordinator: David A. Burt

The Russian-American Observational Satellite (RAMOS) experiment is a joint Russian-American space research program using an innovative measurement technique and simultaneous stereo-optical imaging. It will address the twin concerns of surveillance and environment. RAMOS will be comprised of the development of different measurement techniques that may culminate in the operation of two satellites, the American Observational Satellite (AOS) and the Russian Observational Satellite (ROS), and associated ground site equipment.

NASA/USU-SDL Gas Exchange Measurement System

Coordinator: Gail E. Bingham

The Mir program at the Space Dynamics Laboratory is part of an experiment called FBI-2 (Fundamental Biology Investigations 2), which is operated by the NASA-Ames Research Center. GEMS is designed to measure the respiration of plants that are being grown in a small greenhouse of the Russian Mir Space Station. The measurements collected from the experiment allow scientists to accurately determine what factors affect the growth of plants in space, which is vital for the future design of long-term missions. The GEMS system is currently being used to collect data on wheat growing in the Mir Space Station.

USAID/USU/CID/Uganda Cooperative Agreement for Makerere University's Biological Field Station

Coordinator: Terry L. Sharik

The College of Natural Resources at USU, as lead university for the Consortium for International Development, has been selected to assist Makerere University's Biological Field Station (BFS) at Kibale National Park to improve and manage its physical facilities and research and training opportunities. In addition, the project will develop and implement an international publicity and marketing campaign for the BFS. Partners include Lincoln University and the Missouri Botanical Gardens.

USU International Irrigation Center

Director: Humberto L. Yap-Salinas

The Biological and Irrigation Engineering Department is engaged in an extensive program of international irrigation technology transfer and is contributing significantly to the alleviation of the world hunger problem through multi-lingual training and research in irrigation and drainage. The International Irrigation Center has been organized to provide an appropriate entity within which to sponsor these ongoing training activities.

The USU Institute for International Rural and Community Development

Director: Brad W. Parlin

The institute coordinates the international development activities of Utah State University's social sciences faculty. Its main objective is to actively participate in overseas research, extension, teaching, and curriculum development. Acting as a funding center for over two dozen development specialists, the institute is able to design, execute, evaluate, or assist international development projects from an interdisciplinary base.

Center for International Studies

Director: R. Edward Glatfelter

The Center for International Studies promotes and coordinates international academic exchanges between Utah State University and the institutions of higher education abroad. The major objectives of the center are: (1) to develop bilateral university linkage programs, (2) to facilitate faculty and student exchange programs, and (3) to promote collaborative research programs, joint seminars, workshops, and conferences. The center also serves as the university academic center for international studies curriculum offerings and the Certificate Program for International Development.

Consortium for International Development (CID)

Trustees: Morris D. Whitaker and A. Bruce Bishop

Utah State University is a member of the Consortium for International Development, which was incorporated in Utah in 1972 and is a continuation of the founding organization known as CUSUSWASH, which dates back to 1967. A legal nonprofit corporation, the consortium is concerned with the orderly development of increased world food production and nutrition.

The consortium brings together the expertise of 12 universities located in the western United States. In addition to USU, member universities are: University of Arizona, California State Polytechnic University/Pomona, Colorado State University, University of Hawaii, University of Idaho, University of Montana, New Mexico State University, Oregon State University, Texas Tech University, Washington State University, and University of Wyoming.

The consortium is governed by a Board of Trustees, with two trustees appointed by the president of each member institution. The board defines policy and guidelines and has delegated the implementation and management of the consortium to an executive director, secretary/treasurer, and appropriate staff.

ABD/Government of Thailand/USU/CID Skills Development Project

Coordinators: A. Bruce Bishop and Yun Kim

Utah State University, lead university on this project, and the Consortium for International Development were awarded a five-year contract to provide technical consulting services for the Thailand Skills Development Project, which seeks to improve the technical training level of Thai citizens. Funded by the Asian Development Bank and the Thai Government, the focus of the project is expanding and strengthening Thailand's skill development institutes and centers operated under the Thai Ministry of Labor and Social Welfare.

USAID/USU Global Livestock Collaborative Research Support Program (GL-CRSP)
Coordinator: D. Layne Coppock

The Global Livestock CRSP is a program of applied research and outreach, with the goal of improving pastoral risk management using asset and income diversification, enhancement of information flow and use, and improving access to external resources. The project focus is on one intact ecological and livestock marketing region in northern Kenya and southern Ethiopia. Research will identify context-sensitive interventions at various socio-economic levels. Intervention concepts will be organized with respect to four cross-cutting systems, including livestock marketing, rural finance, natural resource tenure, and public service delivery. Outreach will focus on how to help development agents and policy makers deliver comprehensive packages of risk management interventions to beneficiaries.

University Relations and Development

Vice President for University Relations and Development: Paul M. Norton
Office in Main 102, (435) 797-1158
Associate Vice President for Development: Lee Gibbons, Main 112A, (435) 797-1331

Assistant to Vice President for University Relations and Development: Janet L. Appuhn, Main 101G, (435) 797-1280

Good teaching, sound research, practical services performed well, and productive students and alumni are USU's chief means of public relations and development activity.

However, as a public, tax-assisted institution, the University has the responsibility of keeping the public informed as to its operation. The Office of University Relations assumes this responsibility and plans and executes a wide variety of programs and projects designed to maintain contact between the University and the various publics it serves.

USU Development Office

Central Office

Assistant Vice President, Development: Lee Gibbons, M 112A, (435) 797-1331, leeg@relations.usu.edu
Executive Director, Communications: Thomas L. Allen, M 112E, (435) 797-1324, thomasa@relations.usu.edu
Director of Planned Giving: Rebecca A. Dukes, M 101B, (435) 797-1326, radukes@relations.usu.edu
Director of Donor Relations: Shirley C. Keyes, M 101D, (435) 797-1325, shirleyk@relations.usu.edu
Director of Corporate/Foundation Giving: Steven R. Morris, M 112D, (435) 797-1323, stevenm@relations.usu.edu
Director of Annual Support: Thomas A. Dyson, M 101C, (435) 797-1321, tomd@relations.usu.edu

College and Division Offices

Development Director, College of Agriculture: Victor J. Saunders, AG S 214, (435) 797-2208, vics@cc.usu.edu
Development Director, College of Business: Stephen F. Neeley, B 302, (435) 797-3720, sneeley@b202.usu.edu
Development Director, College of Education: Wesley K. Boman, EDUC 116, (435) 797-1611, wboman@cc.usu.edu
Development Director, College of Engineering: Robert L. Davis, EC 208B, (435) 797-2762, bob@engineering.usu.edu
Development Director, College of Family Life: (435) 797-1530
Development Director, College of Humanities, Arts and Social Sciences: Francis C. McGovern, M 331, (435) 797-3662, frankmcg@wpo.hass.usu.edu
Development Director, College of Natural Resources: Mary Lu Roskelley, NR 104A, (435) 797-2760, roskelly@cc.usu.edu
Development Director, College of Science: D. Jerome Davies, SER 102, (435) 797-3510, jeromed@cc.usu.edu
Development Director, Athletics: M. Rance Pugmire, SPEC 202T, (435) 797-0912, rpug@cc.usu.edu
Development Director, Utah Public Radio-KUSU: Bryan K. Earl, MLS 118E, (435) 797-3107, bryear@upr.usu.edu
Development Director, Learning Resources Program: John C. Payne, L 436, (435) 797-2860, johpay@cc.usu.edu

The mission of the USU Development Office is to provide professional assistance to the publics of Utah State University in the transmission of charitable gifts, providing needed financial support to the institution and its programs.

The Development Office was established in 1967 to seek private contributions. The resulting generosity of USU's alumni and friends has vastly enhanced USU's teaching, research, service, and the accessibility of higher education to many students. Significant contributions to Utah State University are recognized through membership in various donor clubs and activities, including Old Main Society, Big Blue Athletic Club, the Alumni Association, and sponsored endowments.

Student tuition and fees pay only 15 percent of USU's operating budget and state support provides only 34 percent. The remainder must come from other sources. Private contributions provide a growing and very important part of the cost of providing an education of the highest quality.

For further information on how to transmit cash, securities, or in-kind property to the University through a number of tax-advantaged strategies, contact: **The USU Development Office, Main 101, 1420 Old Main Hill, Logan UT 84322-1420, tel. (435) 797-1320 or toll-free 1-888-OLD-MAIN (653-6246).**

University Alumni Association

President: David Moore
Director of Alumni Relations: G. Carlos Smith
Office in the David B. Haight Alumni Center, (435) 797-2055, 1-800-291-2586

The Utah State University Alumni Association now numbers

more than 180,000 members. This membership includes all who have attended USU for one quarter (or one semester) or more or who have served on the staff or faculty of the University.

Purpose: The mission of the Alumni Association is to promote the interests and welfare of Utah State University, as well as that of USU alumni, students, faculty, staff, and friends.

Government: The governance of the association is vested in the Executive Board. The board is comprised of the president and vice president of the association, the vice president of University Relations and Development, the president of the Associated Students of USU, the president of the Emeriti, the president of the Young Alumni, the president of the Student Alumni Association, a College Alumni/Development representative, a University faculty representative, the director of Alumni Relations, the immediate past president of the association, and representatives of regional alumni chapters selected by the Council of Chapter Presidents with the approval of the Executive Board.

Function: The Alumni Association is the medium through which former students maintain contact with the University and are served after leaving the campus. Efforts are made to maintain a complete record of every former student throughout life, and his or her accomplishments and progress are recorded. Former students receive *Utah State University Magazine,* an official publication of USU, full of news and articles about the University. The association maintains alumni volunteers and chapter organizations throughout Utah and in major areas where former students are located. Through the association, former students are kept in contact with each other, and they meet and participate in business and social activities. They likewise assist the University with special projects in their areas.

The Alumni Association takes the leadership in sponsoring such campus events as Homecoming, Founders Day, Distinguished Service Awards, Aggie Lagoon Day, Aggie Family Day, and reunions. The association also provides opportunities for travel through the alumni travel program, and aids in athletic and other school activities.

University Media Relations and Marketing

Director of Media Relations and Marketing: John DeVilbiss
Office in Information News Services 105, (435) 797-1351

Media Relations/Marketing
Assistant Director: Clifford R. Cahoon
Audio News Producer: Craig Hislop
Writer/Editor, *Staff News*: R. Patrick Williams
Writer/Editor: Lynnette F. Harris
Writer/Editor: Tim Vitale
Editor of *Utah State University Magazine*: Jane G. Koerner
Writer/Editor and Asst. Editor of *Utah State University Magazine*: Dennis L. Hinkamp
Graphic Artist: Holly Broome-Hyer

University Extension Media Relations/Marketing
Director: John DeVilbiss
Writer/Editor: Dennis L. Hinkamp
Extension Publications and Continuing Education Editor: Donna H. Falkenborg
Graphic Artist: Holly Broome-Hyer

Editorial Services
Director: John DeVilbiss
University Editor: Linda E. Keith (on leave)
Webmaster and Acting Editor: Paula H. Larsen
Assistant University Editor: Sally McGovern

Media Relations and Marketing exists to influence favor and support for Utah State University. As part of its marketing and promotions task, this office disseminates information daily and weekly through the press, radio, and television. It includes articles on research and news of general campus events.

Liaison between the University and the news media is maintained by this office.

Media Relations and Marketing publishes *Utah State University Magazine*, *Impact*, and *Staff News*. *Utah State University Magazine* is devoted to reporting information about Utah State University to alumni, parents, and other friends of the institution. *Impact* is a quarterly newsletter sent to Utah opinion leaders and friends of USU. *Staff News* is a weekly newsletter distributed to University employees.

Utah Public Radio

General Manager: Richard S. Meng
Program Director: Lee M. Austin
Chief Engineer: Clifford J. Smith
Producer and Promotion Coordinator: Craig Hislop
Operations Coordinator: Tom W. Williams
Office Supervisor: Karen Larsen
Office in Multimedia and Distance Learning Services 110, (435) 797-3138

During more than 45 years of broadcasting, Utah Public Radio has provided a wide variety of noncommercial radio programming which has extended the vast resources of Utah State University to the residents of the state. Utah Public Radio has also provided training to many students in the use, operation, and human service of the radio medium.

Utah State University is the licensee of KUSU-FM and KUSR Radio and a series of nearly 30 translator and booster stations which comprise Utah Public Radio (UPR). Serving people throughout the state, UPR is a natural portion of a land grant institution. This broadcast station and its series of translators take the UPR signal to St. George on the south and Vernal on the east. Through informative, interesting, educational, and timely broadcasts, UPR conveys the knowledge and intellectual service of a faculty whose literary, scientific, technical, and philosophical interests comprehend much of the field of learning. Issues and ideas of local, national, and international import are actively explored, investigated, analyzed, and interpreted. The broadcasts help listeners to better understand themselves, their government, their institutions, their neighbors, and their natural and social environment. Through understanding and genuine concern, they can intelligently fulfill their obligations of citizenship and find personal satisfaction.

Nora Eccles Harrison Museum of Art

Director and Chief Curator: Steven W. Rosen, (435) 797-0164
Education Coordinator: DeAnn E. Lester, (435) 797-0166
Staff Assistant: Linda L. Pierson, (435) 797-1414
Collections Manager: Elizabeth Weninger, (435) 797-0166

The Nora Eccles Harrison Museum of Art is the major center for the exhibition of the visual arts in Northern Utah. Emphasizing

the breadth of artistic expression and the history of art in the western United States, the Museum's permanent collections include 20th century American sculpture, ceramics, paintings, graphic arts, photographs, and American Indian arts. Selections from the collection are always on view and are rotated periodically to reflect the continuing growth and refinement of the collection. In addition to installations of its permanent holdings, the Museum organizes temporary and traveling exhibitions and serves as a venue for exhibitions of national and international stature. Artist talks, films, docent tours, and educational activities are additional dimensions of the Museum's programs which are designed to interpret, present, and foster the development of the visual arts.

As a component of Utah State University, the Museum provides educational opportunities for undergraduate and graduate students pursuing professional careers in the museum field. Through on-the-job training, independent study, and internships, students participate in collections care and management, exhibition development, installation design, and educational programming. Research and publication are also integral parts of the Museum's educational offerings, and students, along with faculty and other scholars, pursue projects which are relevant to the permanent collections and exhibitions.

Named for its benefactor, the Nora Eccles Harrison Museum was made possible through an insightful and generous gift from the Nora Eccles Treadwell Foundation. Designed by internationally acclaimed architect, Edward Larabee Barnes, the 20,000-square-foot structure includes offices, a workshop, library, storage facilities, and five exhibition galleries.

For more information, write or call: Nora Eccles Harrison Museum of Art, Utah State University, 4020 Old Main Hill, Logan UT 84322-4020, (435) 797-0163, FAX (435) 797-3423.

Records Management Office

Office Manager and Information Systems Specialist: Colleen M. Hobson
Office in Main 110, (435) 797-1285
Office Assistant: June McDonald
Office Assistant: Mary Draper

The Records Management Office is responsible for maintaining, providing access to, and training on the Alumni Development System (ADS System). All changes to the files and tables on the ADS system are sent to this office for input and control. All lists, mailing labels, reports, and downloads from the ADS system are prepared by this office. The Records Management Office is also responsible for maintaining, providing access to, and training for all appropriate University units on the Alumni/Development Document Management System.

American West Heritage Center

Associate Director: Ronda L. Thompson
Executive Assistant: JoAnn R. Poulsen
Office in Heritage House, (435) 797-1143

The mission of the American West Heritage Center is to preserve the history, heritage, culture, art, folk life, music, and personal and social values found in the nineteenth century, to effect facilities, environments, and programs of preservation, recreation, and education. After years of nurturing, the Festival of the American West and the Ronald V. Jensen Living Historical Farm and Museum were merged into the American West Heritage Center. The center administers the operation and growth of these two award-winning programs involved in historical preservation, education, economic development, and heritage tourism. By providing internships and scholarship programs centered around cultural heritage, the center fosters programs beneficial to the University.

University Publications Editors

University Editor, Editorial Services: Linda E. Keith (on leave through 10-31-99)
Webmaster and Acting University Editor: Paula H. Larsen
Assistant University Editor: Sally McGovern
Student Services Editor and Catalog Editor: Sheri E. Peterson
Extension Publications and Continuing Education Editor: Donna H. Falkenborg
Agricultural Experiment Station Editor: James Thalman
USU Press and Scholarly Publications Editor: John R. Alley, Jr.
Assistant Athletic Director—Media Relations: Michael C. Strauss
***Utah State University Magazine* Editor:** Jane G. Koerner
***Staff News* Editor:** R. Patrick Williams
***The Utah Statesman* Adviser**: Jay C. Wamsley
***USU and YOU*, (High School/College Relations) Coordinator:** Jan H. Benson
***Utah State Biotechnology* and *Biotechnology News* Editor:** John T. Lohr
Utah Water Research Laboratory Editor: Leaunda S. Hemphill
Space Dynamics Laboratory, Program Development and Support Center Senior Editor: Carla D. Calhoun

College of Agriculture

***Newsline* (college alumni newsletter) Editor:** Vic Saunders
***Western Center Dairy Newsletter* Editor:** Carl Brothersen

College of Business

Partners Program Editor: Alta Markeson
***Perspectives* (Department of Economics alumni newsletter) Editor:** Ruby L. Vazquez
***School of Accountancy Newsletter* (alumni) Editor:** Clifford R. Skousen
***Information Systems Educator* (BISE alumni/professional newsletter) Co-editors:** Susan M. Jones, Marianna Larsen

College of Education

College Publication Specialist: Melanie Stein
Center for Persons with Disabilities Information Specialist: Kelleen Smith
Center for Persons with Disabilities Newsletter Editors:
***CFP News* and *UATP News*:** Sharon H. Weston
***CPD News*, *Enables*, and *Parent News*:** Marlene Deer
SKI*HI Institute Publication Specialist/Editor/ Instructional Designer: Mary Ann Parlin

College of Engineering

***The Signal* (Department of Electrical and Computer Engineering alumni newsletter) Editor:** Charles M. Swenson

College of Family Life

***Family Life* (college alumni newsletter) Coordinator:** Teresa Passey
***Dietetics Newsletter* (alumni) Editor:** Noreen B. Schvaneveldt

College of Humanities, Arts and Social Sciences

***HASS Connections* (college alumni newsletter) Editor:** Sydney M. Peterson
***Western American Literature* Editor:** Melody Graulich
***Western Historical Quarterly* Editors:**
Executive Editor: Clyde A. Milner, II
Editor: Anne M. Butler
Co-editor: David R. Lewis
Assistant Editor: Ona W. Siporin
***Insites* (LAEP alumni newsletter) Adviser:** Ardith Poulsen
***Extra!* (Communication Department alumni/friends newsletter) Editors:** Michael S. Sweeney, Edward C. Pease
***Utah State Theatre Newsletter* Editor:** Colin B. Johnson
***Renascence* Editor:** Jeffrey Smitten
***Petroglyph* Executive Director:** Cierce Chamberlain
***Ploutarchos* Editor:** Frances B. Titchener

College of Natural Resources

***Resource Lines* (alumni newsletter) Editor:** Mary Lu Roskelley
***Complexity in Ecological Systems* Editor:** David W. Roberts
***Utah Geographic Alliance Newsletter* Editor:** Clifford B. Craig

College of Science

***Insights* (alumni newsletter) and *Science Scene* Editor:** Colette D. Yates
***Biolog* Editor:** Liz Allred

Affirmative Action/Equal Opportunity Office

Director: Sue Guenter-Schlesinger
Office in Main 161, (435) 797-1266

It is the policy of Utah State University to ensure equal educational and employment opportunity regardless of race, color, religion, sex (including sexual harassment), national origin, age, disability, or veteran status. In addition, discrimination based on sexual orientation is prohibited in evaluating employee or student performance. The Affirmative Action/Equal Opportunity (AA/EO) Office implements federal, state, and University anti-discrimination laws, statutes, and policies, and strives to provide an atmosphere in which students, staff, and faculty can work, study, and live without fear of discrimination or sexual harassment. It also works to increase access to education and employment for groups who have traditionally faced barriers to opportunities in these areas. With this in mind, the AA/EO Office focuses on a variety of areas, services, and responsibilities, including the following:

1. Developing and monitoring affirmative action policies, plans, and programs at USU which are aimed at increasing participation in employment and education programs of underrepresented groups, to include women, ethnic minorities, veterans, and people with disabilities;
2. Investigating, processing, and resolving discrimination and sexual harassment complaints. Federal law prohibits retaliation against individuals who file or participate in the investigation of discrimination or sexual harassment complaints;
3. Enhancing awareness of and sensitivity toward ethnic, cultural, gender, and disability differences.
4. Providing training on various aspects of affirmative action/equal opportunity laws, the prevention of sexual harassment, and valuing diversity.
5. Monitoring the representation of underrepresented groups among students, faculty, and staff.

Utah State University is dedicated to providing equal opportunity in education and employment to all students, faculty, and staff. University members who feel their rights have been violated, want information, or just need some guidance relating to their course of action, should contact the Affirmative Action/Equal Opportunity Office, located in Main 161, or call (435) 797-1266. Copies of the complete Affirmative Action Plan and the Discrimination Complaint Policy, along with information pertaining to AA/EO-related laws and policies at the local (USU), state, and federal levels, are available in the AA/EO Office.

Faculty and Professional Staff

AADLAND, DAVID M. (1997) Asst. Prof., Economics. BA 1991 Augustana College, MS 1992 University of Montana, PhD 1997 University of Oregon.

ABBOTT, BEN A. (1995) Asst. Prof., Electrical and Computer Engineering. BS 1983 Texas Tech University, MS 1989, PhD 1994 Vanderbilt University.

ABENDROTH-SMITH, JULIANNE (1993) Asst. Prof., Health, Physical Education and Recreation. BS 1985 University of Colorado, MS 1988 University of Oregon, EdD 1993 University of Northern Colorado.

ADAMS, D. JACK (1997) Adjunct Prof., Civil and Environmental Engineering. BS 1974 University of Utah, MS 1979, PhD 1981 Utah State University.

ADAMS, TAMARA LEE (1997) Computer Specialist, Financial Aid Office. BS 1985 Brigham Young University.

ADAMSON, KATHLEEN A. (1975, 1979) Asst. Director, Career Services and Cooperative Education. BS 1965 University of Utah, MS 1987 Utah State University.

ADAMSON, SHAUN R. (1997) Asst. Librarian, Library and Information Services, Information and Learning Resources Program. BA 1994, MLS 1996 University of South Florida.

ADDLEY, CRAIG R. (1994) Research Engineer, Utah Water Research Laboratory. BS 1989, MS 1993 Utah State University.

ADKINS, DAN F. (1993) Adjunct Asst. Prof., Civil and Environmental Engineering. BS 1982, MS 1983, PhD 1990 Utah State University.

AFLATOONI, KIAN (1987) Adjunct Asst. Prof., Civil and Environmental Engineering. BS 1979, MS 1981 University of Nebraska.

AGRAN, MARTIN (1982) Prof. and Consortium in Sensory Impairments Coordinator, Special Education and Rehabilitation. BA 1969 City College of New York, MA 1971 University of Rochester, MS 1976 Western Oregon State College, PhD 1984 University of Illinois.

AHLSTROM, C. BLYTHE (1964, 1979) Asst. Provost, Provost's Office; Adjunct Asst. Prof., History. BS 1958, MS 1961 Columbia University.

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