2007

University of Arkansas Graduate School Catalog, 2006-2007

University of Arkansas, Fayetteville

UNIVERSITY OF ARKANSAS

2006-2007 Graduate School Catalog

Welcome to the University of Arkansas

This catalog of studies is a comprehensive reference for your years of graduate study – a list of courses and degrees offered through the Graduate School at the University of Arkansas. It offers valuable information such as suggested and required degree plans and information about costs, scholarships and financial assistance, and campus resources. Read it with pleasure and with care.

The University of Arkansas is committed to your success. The faculty and staff are here to support you as you work to achieve your goals. Ask for help and advice whenever you need it. Take every opportunity to consult your academic adviser to ensure that you are taking advantage of courses and University resources that will help you reach your educational and career goals and graduate on time.

The University of Arkansas provides educational opportunities to all qualified students regardless of their economic or social status and will not discriminate on the basis of race, color, sex, creed, sexual orientation, disability, veteran's status, age, marital or parental status, or national origin.

This catalog presents specific information about the University of Arkansas and the Graduate School, including admission requirements, registration fees, curricula offered, degrees granted, and courses available.

The University also publishes a *Catalog of Studies*, which outlines similar information for undergraduate programs offered in the individual colleges and schools on the Fayetteville campus. The *School of Law Catalog* describes the professional programs offered at Fayetteville. The University of Arkansas for Medical Sciences publishes catalogs for the Colleges of Nursing, Health Related Professions, Pharmacy, and Medicine, all located in Little Rock. Other graduate programs are available through UA-Monticello, UA-Pine Bluff, and UA-Little Rock.

The courses listed in this catalog have been authorized in accordance with policies approved by the academic colleges and the Graduate Council. Schedules of classes for each semester must be consulted for courses to be offered during a given semester, since the frequency of offering of each course is determined by the department as program needs dictate, with no assurance that a given course will be offered every year. The summaries of courses and prerequisites, when stated, are meant to serve as a guide to degree program planning and are subject to specific determination and consultation with program advisers.

Copies of the *Catalog of Studies* as well as information concerning undergraduate academic programs, fees, financial aid, or housing on the Fayetteville campus may be obtained by writing or calling the Office of Admissions, 200 Silas H. Hunt Hall, University of Arkansas, Fayetteville 72701. A toll-free telephone number, 1-800-377-8632 is available.

Copies of the *Graduate School Catalog* may be obtained by writing, calling, or e-mailing the Graduate School, 119 Ozark Hall, University of Arkansas, Fayetteville 72701; 479-575-4401; http://www.uark.edu/grad/.

The *Graduate School Catalog* and all other catalogs from the University of Arkansas may be viewed and searched online at:
http://catalogofstudies.uark.edu/.

Contents

2006 Academic Calendar

SUMMER SESSION I 2006 (29 CLASS DAYS)

April 10-May 23	Open Registration
May 22	Classes begin
May 23	Last day to register, add a course, or change from audit to credit
May 25	Last day to drop without a mark of "W" or change from credit to audit
May 29	Memorial Day Holiday
June 19	Last day to drop a Session I class
June 30	Last day to officially withdraw from Session I
June 30	Last day of classes for Session I

SUMMER SESSION II 2006 (29 CLASS DAYS)

April 10-July 5	Open Registration
July 3	Classes begin
July 4	Independence Day Holiday
July 5	Last day to register, add a course, or change from audit to credit
July 7	Last day to drop without a mark of "W" or change from credit to audit
July 31	Last day to drop a Session II class
August 11	Last day to officially withdraw from Session II
August 11	Last day of classes for Session II

SUMMER SESSION III 2006 (58 CLASS DAYS)

April 10-May 25	Open Registration
May 22	Classes begin
May 25	Last day to register, add a course, or change from audit to credit
May 29	Memorial Day Holiday
June 1	Last day to drop without a mark of "W" or change from credit to audit
July 4	Independence Day Holiday
July 18	Last day to drop a Session III class
August 11	Last day to officially withdraw from Session III
August 11	Last day of classes for Session III

SUMMER SESSION IV 2006 (49 CLASS DAYS)

April 10-June 7	Open Registration
June 5	Classes begin
June 7	Last day to register, add a course, or change from audit to credit
June 13	Last day to drop without a mark of "W" or change from credit to audit
July 4	Independence Day Holiday
July 20	Last day to drop a Session IV class
August 11	Last day to officially withdraw from Session IV
August 11	Last day of classes for Session IV

SUMMER SESSION V 2006 (24 CLASS DAYS)

April 10-June 6	Open Registration
June 5	Classes begin
June 6	Last day to register, add a course, or change from audit to credit
June 7	Last day to drop without a mark of "W" or change from credit to audit
June 27	Last day to drop a Session V class
July 4	Independence Day Holiday
July 7	Last day to officially withdraw from Session V
July 7	Last day of classes for Session V

SUMMER SESSION VI 2006 (25 CLASS DAYS)

April 10-July 11	Open Registration
July 10	Classes begin
July 11	Last day to register, add a course, or change from audit to credit
July 12	Last day to drop without a mark of "W" or change from credit to audit
August 1	Last day to drop a Session VI class
August 11	Last day to officially withdraw from Session VI
August 11	Last day of classes for Session VI

FALL 2006 (73 CLASS DAYS; 43 MWF, 30 TT)

April 10-Aug 25	Open Registration for currently enrolled students
August 16-25	Open Registration for all students
August 21	Classes begin
August 25	Last day to register, add a course, or change from audit to credit
September 1	Last day to drop without a mark of "W" or change from credit to audit
September 4	Labor Day Holiday
October 27	Last day to drop a fall semester class
November, Early	Priority Registration for Spring 2007 - dates not available at publication time
November 22	Fall Break (administrative offices will be open.)
November 23-24	Thanksgiving Holiday
December 5	Last day to officially withdraw from all classes
December 5	Last day of classes for fall semester
December 6	Dead Day
December 7-13	Final exams

The University's official five-year academic calendar is located on the World Wide Web at http://www.uark.edu/classes/CalCover.html.

2007 Academic Calendar

Spring 2007 (73 CLASS DAYS; 43 MWF, 30 TT)

January 10-22	Open Registration
January 15	Martin Luther King Day
January 16	Classes begin
January 22	Last day to register, add a course, or change from audit to credit
January 29	Last day to drop without a mark of "W" or change from credit to audit
March 19-23	Spring Break Week
March 30	Last day to drop a spring semester class
May 3	Last day to officially withdraw from all classes
May 3	Last day of classes for spring semester
May 4	Dead Day
May 5-11	Final exams
May 12	All University Commencement
May 19	Law School Commencement

Summer Session I 2007 (29 CLASS DAYS)

May 21	Classes begin
May 28	Memorial Day Holiday
June 29	Last day of classes for Session I

Summer Session II 2007 (29 CLASS DAYS)

July 2	Classes begin
July 4	Independence Day Holiday
August 10	Last day of classes for Session II

Summer Session III 2007 (58 CLASS DAYS)

May 21	Classes begin
May 28	Memorial Day Holiday
July 4	Independence Day Holiday
August 10	Last day of classes for Session III

Summer Session IV 2007 (49 CLASS DAYS)

June 4	Classes begin
July 4	Independence Day Holiday
August 10	Last day of classes for Session IV

Summer Session V 2007 (24 CLASS DAYS)

June 4	Classes begin
July 4	Independence Day Holiday
July 6	Last day of classes for Session V

Summer Session VI 2007 (25 CLASS DAYS)

July 9	Classes begin
August 10	Last day of classes for Session VI

Fall 2007 (73 CLASS DAYS; 43 MWF, 30 TT)

August 20	Classes begin
September 3	Labor Day Holiday
November 21	Fall Break (administrative offices will be open)
November 22-23	Thanksgiving Holiday
December 4	Last Day of Classes
December 5	Dead Day
December 6-12	Final Exams

MAY 2006

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JUNE 2006

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JULY 2006

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AUGUST 2006

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SEPTEMBER 2006

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OCTOBER 2006

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29	30	31				

NOVEMBER 2006

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DECEMBER 2006

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JANUARY 2007

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28	29	30	31			

FEBRUARY 2007

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MARCH 2007

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APRIL 2007

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MAY 2007

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20	21	22	23	24	25	26
27	28	29	30	31		

JUNE 2007

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17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY 2007

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22	23	24	25	26	27	28
29	30	31				

AUGUST 2007

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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

UNIVERSITY OF ARKANSAS

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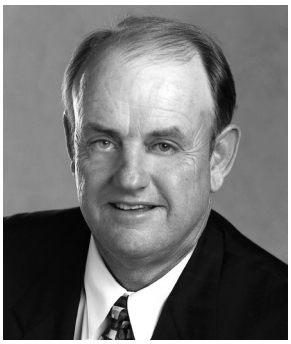

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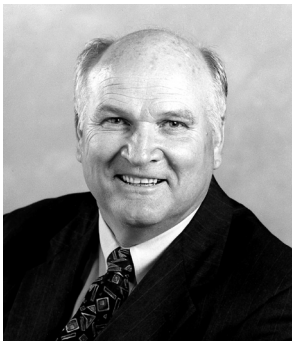

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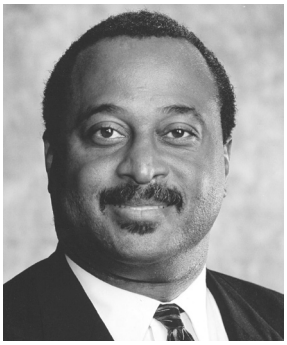

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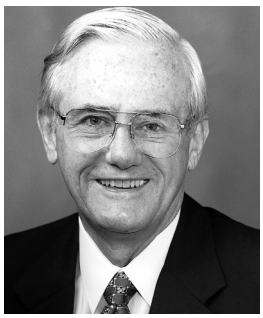

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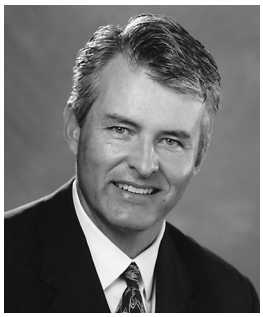

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Paragould
Term Expires 2010

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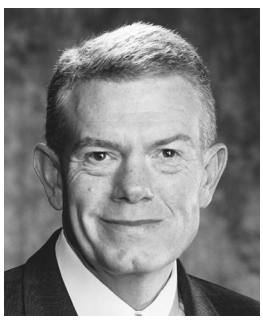
Hot Springs
Term Expires 2011



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Term Expires 2013

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Term Expires 2014

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Term Expires 2015

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Two representatives from the Graduate Dean's Student Advisory Board

Table of Graduate Degree Programs and Degrees

Degree Programs	Department	Degree	Test Required for Admission GRE	MAT	GMAT	Letter of Recommend.	Dept. Appl. & Admission Requirements	Dissertation or Thesis Required	For. Lang. Required for Graduation
Accounting[1]	ACCT	M.Acc.	N	N	Y	3B	B	N	N
Agricultural & Extension Education	AEED	M.S.	Y or	Y	N	Y	N	Opt	N
Agricultural Economics	AEAB	M.S.	Opt	Opt	Opt	3	N	Opt	N
Agricultural Education	AGED	M.A.T.	N	N	N	N	Y	N	N
Agricultural, Food and Life Sciences	AFLS	M.S.	Opt.	Opt.	N	N	N	N	N
Animal Science	ANSC	M.S.	N	N	N	3	N	Y	N
		Ph.D.	Y	N	N	3	N	Y	N
Anthropology	ANTH	M.A.	Y	N	N	3	B	Opt	N
		Ph.D.	Y	N	N	3B	Y	Y	Y
Applied Physics	PHYS	M.S.	N	N	N	3	B	Opt	N
Art	ARTS	M.F.A.	N	N	N	3	B + slides	Y	N
Biological Engineering[4,5]	BENG	M.S.B.E.	Y	N	N	3	Y	Y	Opt
Biology	BISC	M.A.	G	N	N	3	Y	Y	N
		M.S.	G	N	N	3	Y	Y	N
		Ph.D.	G	N	N	3	Y	Y	N
Biomedical Engineering[4]	BENG	M.S.B.M.E.	Y	N	N	3	Y	Y	Opt.
Business Administration[1]	BADM	M.B.A.	N	N	Y	3B	B	N	N
		Ph.D.	N	N	Y	3B	B	Y	N
Cell and Molecular Biology	INTD	M.S.	Y	N	N	Y	Y	Y	N
		Ph.D.	Y	N	N	Y	Y	Y	N
Chemical Engineering[5]	CHEG	M.S.Ch.E.	Y	N	N	Opt	Y	Y	N
Chemistry	CHBC	M.S.	Opt	N	N	3	N	Opt	N
		Ph.D.	Opt	N	N	3	N	Y	N
Childhood Education	CIED	M.A.T.	N	N	N	N	Y	N	N
Civil Engineering[4,5]	CVEG	M.S.C.E.	Y	N	N	N	N	Opt	N
Communication	COMM	M.A.	Y	N	N	3	Writing Sample + Stmt of Goals	Opt	N
Communication Disorders	RHRC	M.S.	Y	N	N	3B	Y	N	N
Comparative Literature	INTD	M.A.	Y	N	N	3	B	Opt	N
		Ph.D.	Y	N	N	3	B	Y	Y
Computer Science	CSCE	M.S.	Y	N	N	3	Stmt of Purpose	Opt	N
		Ph.D.	Y	N	N	3	Stmt of Purpose	Y	N
Computer Engineering[4,5]	CSCE	M.S.Cmp.E.	Y	N	N	3	Y	Opt	N
Counseling	ELCF	M.S.	Y	Y	N	3B	Y	Opt	N
Counselor Education[2]	ELCF	Ph.D.	Y	N	N	3B	Y	Y	N
Creative Writing	ENGL	M.F.A.	Y	N	N	3	Writing Sample + B	Y	N
Crop, Soil and Environmental Sciences	CSES	M.S.	N	N	N	3	N	Opt.	N
		Ph.D.	N	N	N	3	N	Y	N
Curriculum & Instruction	CIED	Ph.D.	Y	N	N	3	Y	Y	N
Drama	DRAM	M.F.A.	Opt	N	N	3	Y	Y	N
Economics[1]	ECON	M.A.	Y	N	N	3B	B	Opt	N
		Ph.D.	Y	N	N	3B	B	Y	N
Education	EDUC	M.Ed.	N	N	N	Y	Y	N	N
Adult Education	RHRC	Ed.D.	Y	Y	N	3B	Y	N	N
Counselor Education	ELCF	Ed.S.	Y	Y	N	3B	Y	N	N
Educational Administration	ELCF	Ed.S.	Y	Y	N	3B	Y	N	N
		Ed.D.	Y	Y	N	3B	Y	Y	N
Higher Education	ELCF	Ed.S.	Y	Y	N	3B	Y	N	N
		Ed.D.	Y	Y	N	3B	Y	Y	N
Recreation	HKRD	Ed.D.	Y	Y	N	3B	B	Y	N
Vocational Education	RHRC	Ed.D.	Y	Y	N	3B	B	N	N
Educational Administration[2,3]	ELCF	M.Ed.	N	N	N	N	N	Opt	N
Educational Foundations	ELCF	M.S.	Y	N	N	3B	Y	Y	N
		Ph.D.	Y	N	N	3B	Y	Y	Y
Educational Technology	ELCF	M.Ed.	N	N	N	N	N	Opt	N
Electrical Engineering[4,5]	ELEG	M.S.E.E.	Y	N	N	3	Stmt of Goals	Opt	N
Elementary Education[2]	CIED	M.Ed.	N	Y	N	N	Y	Opt.	N

Degree Programs	Department	Degree	Test Required for Admission GRE	MAT	GMAT	Letter of Recommend.	Dept. Appl. & Admission Requirements	Dissertation or Thesis Required	For. Lang. Required for Graduation
Engineering	ENGR	M.S.E.	Opt	Opt	N	N	B	N	N
Biological Engineering	BENG	Ph.D.	Y	N	N	3	Y	Y	Opt
Biomedical Engineering	BENG	M.S.E.	Y	N	N	3	Y	Y	Opt.
Chemical Engineering	CHEG	Ph.D.	G	N	N	Opt	Y	Y	Opt
Civil Engineering	CVEG	Ph.D.	Y	N	N	3	N	Y	N
Computer Engineering	CSCE	Ph.D.	Y	N	N	3	Stmt of Purpose	Y	N
Electrical Engineering	ELEG	Ph.D.	Y	N	N	3	Stmt of Goals	Y	N
Industrial Engineering	INEG	Ph.D.	Y	N	N	3	N	Y	N
Mechanical Engineering	MEEG	Ph.D.	A	N	N	Y	Stmt of Goals	Y	N
Telecommunications Eng.	ELEG	Ph.D.	Y	N	N	3	Stmt of Goals	Y	N
English	ENGL	M.A.	G	N	N	3	B	N	Y
		Ph.D.	G,S	N	N	3	B	Y	Y
Entomology	ENTO	M.S.	Y	N	N	3	N	Y	N
		Ph.D.	Y	N	N	3	N	Y	Opt
Environmental Dynamics	INTD	Ph.D.	Y	N	N	3	B+Writing Sample+ Stmt of Purpose	Y	N
Environmental Engineering[4,5]	CVEG	M.S.En.E.	Y	N	N	N	N	Opt.	N
Food Science	FDSC	M.S.	Y	N	N	2	Stmt of Goals	Y	N
		Ph.D.	Y	N	N	2	Stmt of Goals	Y	N
French	FLAN	M.A.	N	N	N	N	N	N	N
Geography	GEOS	M.A.	N	N	N	3	Y	Y	N
Geology	GEOS	M.S.	N	N	N	3	N	Y	N
German	FLAN	M.A.	N	N	N	N	N	N	N
Health Science	HKRD	M.S.	Opt	Opt	N	N	N	Opt	N
		Ph.D.	Y	N	N	3	Y	Y	N
Higher Education[2,3]	ELCF	M.Ed.	N	N	N	3B	Y	Opt	N
History	HIST	M.A.	Y	N	N	N	N	Opt	N
		Ph.D.	Y	N	N	3	B	Y	Y
Horticulture	HORT	M.S.	Opt	N	N	3	N	Y	N
Human Environmental Sciences	HESC	M.S.	N	N	N	3	N	Opt	N
Industrial Engineering[4,5]	INEG	M.S.I.E.	Y	N	N	3	N	Opt	N
Information Systems[1]	ISYS	M.I.S.	N	N	Y	3B	B	N	N
Journalism	JOUR	M.A.	G	N	N	3	N	Y	N
Kinesiology	HKRD	M.S.	N	N	N	N	N	Opt	N
		Ph.D.	Y	N	N	3	Y	Y	N
Mathematics	MASC	M.S.	N	N	N	N	N	Opt	N
		Ph.D.	N	N	N	N	N	Y	Y
Mechanical Engineering[4,5]	MEEG	M.S.M.E.	A	N	N	Y	N	Opt	N
Microelectronics-Photonics	INTD	M.S.	P	N	N	3	B	P	N
		Ph.D.	P	N	N	3	B	Y	N
Middle-Level Education	CIED	M.A.T.	N	N	N	N	Y	N	N
Music	MUSC	M.M.	N	N	N	Opt	Dept Plcmt Tst	Opt	N
Nursing	NURS	M.S.N.	N	N	N	N	Y	Opt	N
Operations Management	INEG	M.S.O.M.	N	N	N	N	N	N	N
Operations Research[4]	INEG	M.S.O.R.	Y	N	N	3	N	Opt	N
Philosophy	PHIL	M.A.	N	N	N	3	Y	Y	N
		Ph.D.	N	N	N	3	Y	Y	Y
Physical Education	HKRD	M.A.T.	N	N	N	N	Y	N	N
		M.Ed.	N	N	N	N	Y	N	N
Physics	PHYS	M.A.	P	N	N	3	B	N	N
		M.S.	P	N	N	3	B	Y	N
		Ph.D.	P	N	N	3	B	Y	N
Plant Pathology	PLPA	M.S.	N	N	N	3	Y	Y	N
Plant Science	INTD	Ph.D.	Y	N	N	3	Y	Y	N
Political Science	PLSC	M.A.	Y	N	N	3	Writing Sample	Opt	N
Poultry Science	POSC	M.S.	Y	N	N	3	N	Y	N
		Ph.D.	Y	N	N	3	N	Y	N
Psychology	PSYC	M.A.	Y	N	N	3B	Y	Y	N
		Ph.D.	Y	N	N	3B	Y	Y	N
Public Administration	PLSC	M.P.A.	Y	N	N	3	Writing Sample	N	N
Public Policy	INTD	Ph.D.	N	N	N	3	Y	Y	N
Recreation[3]	HKRD	M.Ed.	Opt	Opt	N	N	N	Opt	N
Rehabilitation	RHRC	M.S.	N	N	N	3	Y	Opt	N
		Ph.D.	Y	N	N	3	Y	Y	N
Secondary Education[2]	CIED	M.A.T.	N	N	N	3	Y	N	N
		M.Ed.	N	Y	N	N	Y	Opt	N
Secondary Mathematics	MASC	M.A.	N	N	N	N	N	Opt	N
Social Work	SCWK	MSW	Y or	Y	N	3	Y	Y	N
Sociology	SOCI	M.A.	N	N	N	2	Y	Opt	N
Space and Planetary Sciences	INTD	M.S.	Opt.	N	N	2	Y	Y	N
		Ph.D.	Opt.	N	N	2	Y	Y	N
Spanish	FLAN	M.A.	N	N	N	N	N	N	N
Special Education	CIED	M.Ed.	N	N	N	N	Y	N	N
Statistics	MASC	M.S.	N	N	N	N	N	N	N
Telecommunications Engineering[4]	ELEG	M.S.	Y	N	N	3	Stmt of Goals	Opt	N
Translation	INTD	M.F.A.	Y	N	N	3	B	Y	Y
Transportation & Logistics Mgmt.[1]	MKTL	M.T.L.M.	N	N	Y	3B	B	N	N
Transportation Engineering[4]	CVEG	M.S.T.E.	Y	N	N	N	N	Opt	N
Vocational Education[2,3]	RHRC	M.A.T.	N	N	N	N	Y	N	N
Workforce Development Education	RHRC	M.Ed.	N	N	N	N	Y	N	N

1. Non-departmental students must obtain permission from department to register for courses in these fields. 2. An Educational Specialist degree in Education is available in this area of study. See Education. 3. A Doctor of Education degree in Education is available in this area of study. See Education. 4. A Master of Engineering degree is available in this area of study. See Engineering. 5. A Doctor of Philosophy degree in Engineering is available in this area of study. See Engineering. **INTD** - Interdisciplinary, **Y**-Yes; **N**-No; **P**-Preferred; **Opt**-Optional; **A**-international applicants only; **B**-forms obtained from and returned to department; **G**-general test; **S**-subject area test.

Summary of Procedures

It is a student's responsibility to ascertain that requirements have been met and deadlines observed.
Degree programs may establish additional requirements.

Procedures for Master's and Specialist Degrees

PROCEDURE	RESPONSIBLE PARTY	ACTION DATE
Formation of program advisory committee and submission of Program Advisory Committee form[1]	Major Adviser/Department Chair/Head	Immediately following admission to degree program for those programs that use an advisory committee
Changes in program advisory committee by memorandum	Major Adviser/Member Leaving Committee	As soon as change occurs
Request transfer of credit by submitting Request for Transfer of Graduate Credit form[1] (master's degrees only)	Major Adviser	Before Graduation
Graduation Application Card[1]	Student	By end of semester in which the degree is to be awarded
Inclusion of name for commencement exercises, regalia, and announcement orders	Student	Deadlines indicated in "Instructions to Graduates"
Removal of incompletes (Change of Grade form)	Student/Instructor	When course requirements have been met
To avoid an incomplete becoming "F"	Student/Instructor	Change of grade form must be submitted twelve weeks into the next major semester of enrollment
Final comprehensive examination (Certified by submission of Record of Progress form[1] with original signatures)	Advisory Committee	Must be completed by graduation

Additional Requirements for the Thesis Option

Selection of thesis title and formation of thesis committee and submission of Master's Thesis Title and Thesis Committee form[1]	Thesis Director/Department Chair/Head	At least three months prior to the date of the defense
Obtain *Guide for Preparing Theses and Dissertations* from Union Bookstore or from the Web	Student	Before first draft of thesis is typed
Defense of thesis	Thesis Committee	At least one week before graduation
Registration for at least six hours of thesis	Student	Before graduation
Submission of preliminary copies to each thesis committee member	Student	At least three weeks before graduation
Preliminary editorial check of thesis	Student	Before final copies of thesis are made
Final copies of thesis to Graduate School and to Mullins Library	Student submits to Graduate School; Graduate School submits to Library	Specific deadline. One week before graduation

1 Forms are available in the Graduate School or on the Web at www.uark.edu/grad.
2 Specific deadlines are available in the Graduate School.

Procedures for Doctoral Degrees

PROCEDURE	RESPONSIBLE PARTY	ACTION DATE
Submission of Declaration of Intent form[1]	Department Chair/Head	Before any requirements can be satisfied
Formation of program advisory committee and submission of Doctoral Program Advisory Committee form[1]	Major Adviser/ Department Chair/Head	Immediately following admission to degree program for those programs that use an advisory committee
Changes in program advisory committee by memorandum	Major Adviser/Member Leaving Committee	As soon as change occurs
Foreign Language Requirement (if required)	Advisory Committee	Determined by committee
Satisfaction of residence: Ph.D., enrollment in two consecutive semesters as a full-time student; Ed.D., enrollment as indicated on an approved Residence Plan form[1]	Student/Adviser	Before graduation
Admission to candidacy	Advisory Committee	Before beginning work on the dissertation
Enrollment in at least one hour of dissertation following passing of candidacy exams	Student	Each semester (including summer) until graduation
Selection of dissertation title & formation of dissertation committee and submission of Doctoral Dissertation Title and Dissertation Committee form[1]	Dissertation Director	At least three months prior to the date of the defense
Registration for at least 18 hours of dissertation	Student	Before graduation
Graduation Application Card[1]	Student	By end of semester in which the degree is to be awarded.
Inclusion of name for commencement exercises, regalia, and announcement orders	Student	Deadlines indicated in "Instructions to Graduates"
Removal of incompletes (Change of Grade form)	Student/Instructor	When course requirements have been met
To avoid an incomplete becoming "F"	Student/Instructor	Change of grade form must be submitted twelve weeks in the next major semester of enrollment
Obtain *Guide for Preparing Theses and Dissertations* from Union Bookstore or from the Web	Student	Before first draft of dissertation is typed
Submission of Announcement of Defense by memorandum	Dissertation Director	At least one week before graduation[2]
Defense of dissertation (Certified by submission of Record of Progress with original signatures[1])	Dissertation Committee	At least one week before graduation[2]
Submission of preliminary copies to each dissertation committee member	Student	At least six weeks before final defense of dissertation
Preliminary editorial check of dissertation	Student	Before final copies of dissertation are made
Final copies of dissertation to Graduate School and to Mullins Library	Student submits to Graduate School; Graduate School submits to Library.	At least one week before graduation[2]

1 Forms are available in the Graduate School or on the Web at www.uark.edu/grad.

2 Specific deadlines are available in the Graduate School.

A Message from the Chancellor

As you move through your graduate career, I invite you to contribute to our vision for the University of Arkansas as a nationally competitive, student-centered research university serving Arkansas and the world. With help from innovative and devoted faculty and bright, hard-working students like you, the University of Arkansas moves closer to realizing this vision with each passing year. Ever-mindful of the vision, we strive to make progress toward five institutional goals:

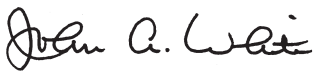
- Strengthening academic quality and reputation by enhancing and developing programs of excellence in teaching, research, and outreach;
- Increasing the size and quality of our student body;
- Enhancing diversity among our faculty, students, and staff;
- Increasing public financial support, particularly that provided by the state and federal government;
- Increasing private gift support from alumni, friends, corporations, foundations, and other organizations.

The University of Arkansas is building on a proud, 134-year history, one that has produced more than 120,000 graduates. While the University is gaining renown for its teaching, research and outreach, it may be best known as the recipient of a historic $300 million gift. Given to the University of Arkansas by the Walton Family Charitable Support Foundation in 2002, this the largest gift ever to an American public research university resulted in a dramatic increase in the University's endowment, including $100 million devoted directly to endowing the UA Graduate School.

The effects are already in evidence. The Graduate School is attracting talented graduate scholars in record numbers. This past fall semester, more than 3,400 graduate students enrolled at the University. Many are taking advantage of the University of Arkansas' unique research facilities and opportunities to work closely with renowned UA faculty members. No matter the field of study they pursue, all students are encouraged to strive for the highest level of achievement.

I invite you to use the UA Graduate School catalog to become better acquainted with who we are and where we're going. On behalf of the University community, I wish you all the best, and I encourage you to take advantage of the lifetime of opportunities waiting for you at the University of Arkansas.

Sincerely,



John A. White
Chancellor

University Profile

VISION

The University of Arkansas is a nationally competitive, student-centered research university serving Arkansas and the world.

HISTORY

Founded as a land-grant college and state university in 1871, the University of Arkansas opened its doors to students on January 22, 1872. Under the Morrill Land-Grant College Act of 1862, federal land sales provided funds for the new university, which was charged with teaching "agricultural and the mechanic arts," "scientific and classical studies," and "military tactics" to Arkansas scholars.

Statewide elections, held to establish voting bonds to help finance the University, eventually determined the school's location. Washington County and the City of Fayetteville submitted the highest bid, a total of $130,000, to which was added a $50,000 state appropriation for the benefit of the institution and $135,000 from the sale of federal lands. With $12,000 of this money, the University purchased a 160-acre farm, the homestead of William McIlroy, and established its campus on a hilltop overlooking the Ozark Mountains.

There were few facilities and little money that first academic year, but the eight students and three faculty members who gathered for classes in 1872 showed the same dedication to learning and commitment to excellence that has carried the University of Arkansas into the 21st century. Over the past 135 years, the University has developed into a mature institution with nine schools and colleges, more than 800 faculty members, and 17,821 students. It serves as the major provider of graduate-level instruction in Arkansas. The research and scholarly endeavors of its faculty make it an economic and cultural engine for the state. And its public service activities reach every county in Arkansas, throughout the nation, and around the world.

MISSION

As a land-grant university, the University of Arkansas strives to fulfill a three-fold mission of teaching, research, and service. In addition, as the flagship campus of the University of Arkansas System, the U of A in Fayetteville serves as the state's major center of liberal and professional education and as Arkansas' main source of theoretical and applied research.

Students pursue a broad spectrum of academic programs leading to baccalaureate, master's, doctoral, and professional degrees, not only in traditional disciplines within arts, humanities, social sciences, and natural sciences, but also in the core professional areas of agricultural, food and life sciences; architecture; business; education; engineering; nursing; human environmental sciences; and law.

The University of Arkansas houses more than 200 academic programs and offers 83 bachelor's degrees in 74 fields of study. Students may also pursue a wide range of graduate degrees, including the Master's, the Educational Specialist, the Doctor of Education, and the Doctor of Philosophy. Information about graduate programs can be found in the Graduate School Catalog or on the World Wide Web at http://www.uark.edu/depts/gradinfo/.

The Carnegie Foundation categorizes the University of Arkansas as a research institution with "high research activity," placing the U of A in the top 10 percent of universities nationwide and in a class by itself within the state of Arkansas. In its 2005 edition, *U.S. News and World Report* ranked the University in the top tier of institutions of higher education. Faculty members perform cutting-edge research for which they annually win prestigious grants and awards, and the University encourages undergraduates to participate in the research process. Such opportunities enhance the learning process by providing hands-on experience in lab and research techniques, by developing students' abilities to implement, experiment, discover and teach, and by fostering a mentoring relationship early in students' academic careers.

Research programs involving both faculty and students serve as vital sources of information on the economic and social needs of Arkansas. In many fields, research performed at the University of Arkansas reaches beyond the state to provide insight and guidance on issues of national and international concern. The University provides extensive technical and professional services to varied groups and individuals throughout the state, helping to further Arkansas' economic growth. The University operates nationally respected high school and college-level correspondence programs; it assists other institutions in developing educational programs; it offers graduate programs, both cooperatively and singly, throughout the state; and it makes specialized campus resources such as computing services and library holdings available to other institutions in the state.

LOCATION

A thriving city in the northwest corner of the state, Fayetteville is home to the 345 acres and 130 buildings that comprise the University of Arkansas campus. In the heart of the Ozark Mountains, the city boasts a lively cultural scene and easy access to outdoor recreation. In 2003, *Outside* magazine named Fayetteville 23rd out of the top 40 college towns in America. With a population of 60,000, Fayetteville was heralded as one of Business Week's 2002 "Dazzling Dozen" small cities in the U.S. Northwest Arkansas is the sixth-fastest-growing region in the nation, according to the U.S. Census, and was recently included among the top four "Best Places for Work" by CNN/Money. The Milken Institute rates the metropolitan economy as the eighth strongest in the country. Fayetteville's temperate climate ensures beautiful seasons year-long, and it is central to larger metropolitan areas, including Dallas, Kansas City, Little Rock, Memphis, St. Louis, and Tulsa.

Colleges, Schools, Departments, Certificates, and Degree Programs

Department of Accounting (ACCT)
- M.Acc. in Accounting (ACCT)
- Ph.D. in Business Administration (BADM)

Department of Agricultural and Extension Education (AEED)
- M.A.T. in Agricultural Education (AGED)
- M.S. in Agricultural & Extension Education (AEED)

Department of Agricultural Economics and Agribusiness (AEAB)
- M.S. in Agricultural Economics (AGEC)

Dale Bumpers College of Agricultural, Food and Life Sciences (AFLS)
- M.S. in Agricultural, Food, and Life Sciences (AFLS) (formerly General Agriculture)

Department of Animal Science (ANSC)
- M.S. in Animal Science (ANSC)
- Ph.D. in Animal Science (ANSC)

Department of Anthropology (ANTH)
- M.A. in Anthropology (ANTH)
- Ph.D. in Anthropology (ANTH)

Department of Art (ARTS)
- M.F.A. in Art (ART)

Department of Biological and Agricultural Engineering (BENG)
- M.S.B.E. in Biological Engineering (BENG)
- M.S.B.M.E. in Biomedical Engineering (BMEN)
- M.S.En.E. in Environmental Engineering, in collaboration with Civil Engineering
- M.S.E. in Engineering (BENG)
- Ph.D. in Engineering (BENG)

Department of Biological Sciences (BISC)
- M.A. in Biology (BIOL)
- M.S. in Biology (BIOL)
- Ph.D. in Biology (BIOL)

Graduate School of Business (GSB)
- M.Acc. in Accounting (ACCT)
- M.A. in Economics (ECON)
- M.B.A./J.D., dual degree
- M.I.S. in Information Systems (INSY)
- M.T.L.M. in Transportation and Logistics Management (TLOG)
- M.B.A. in Business Administration (WCOB)
- Ph.D. in Business Administration (WCOB)
- Ph.D. in Economics (ECON)

Department of Chemical Engineering (CHEG)
- M.S.Ch.E. in Chemical Engineering (CHEG)
- M.S.E. in Engineering (CHEG)
- Ph.D. in Engineering (CHEG)

Department of Chemistry and Biochemistry (CHBC)
- M.S. in Chemistry (CHEM)
- Ph.D. in Chemistry (CHEM)

Department of Civil Engineering (CVEG)
- M.S.C.E. in Civil Engineering (CVEG)
- M.S.E. in Engineering (CVEG)
- M.S.En.E. in Environmental Engineering (ENEG)
- M.S.T.E. in Transportation Engineering (TREG)
- Ph.D. in Engineering (CVEG)

Department of Communication (COMM)
- M.A. in Communication (COMM)

Department of Computer Science and Computer Engineering (CSCE)
- M.S. in Computer Science (CSCE)
- M.S.Cmp.E. in Computer Engineering (CENG)
- M.S.E. in Engineering (CENG)
- Ph.D. in Computer Science (CSCE)
- Ph.D. in Engineering (CENG)

Department of Crop, Soil, & Environmental Sciences (CSES)
- M.S. in Crop, Soil, & Environmental Sciences (CSES)
- Ph.D. in Crop, Soil, & Environmental Sciences (CSES)

Department of Curriculum & Instruction (CIED)
- M.A.T. in Childhood Education (CHED)
- M.A.T. in Middle-Level Education (MLED)
- M.A.T. in Secondary Education (SEED)
- M.Ed. in Elementary Education (ELED)
- M.Ed. in Secondary Education (SEED)
- M.Ed. in Special Education (SPED)
- Ed.S. in Education (CIED)
- Ph.D. in Curriculum & Instruction (CIED)

Department of Drama (DRAM)
- M.F.A. in Drama (DRAM)

Department of Economics (ECON)
- M.A. in Economics (ECON)

Ph.D. in Economics (ECON)

College of Education and Health Professions (COEHP)
Ed.S. in Education (EDUC)
Ed.D. in Education (EDUC)

Department of Educational Leadership, Counseling and Foundations (ELCF)
Graduate Certificates (non-degree) in the following:
Education Policy Studies (EDPO)
Educational Measurement (EDME)
Educational Program Evaluation (EDEV)
Educational Statistics and Research Methods (EDST)
M.Ed. in Educational Administration (EDAD)
M.Ed. in Educational Technology (ETEC)
M.Ed. in Higher Education (HIED)
M.S. in Counseling (CNSL)
M.S. in Educational Foundations (EDFD)
Ed.S. in Education (CNED)
Ed.S. in Education (EDAD)
Ed.S. in Education (HIED)
Ed.D. in Education (EDAD)
Ed.D. in Education (HIED)
Ph.D. in Counselor Education (CNED)
Ph.D. in Educational Foundations (EDFD)

Department of Electrical Engineering (ELEG)
M.S.E.E. in Electrical Engineering (ELEG)
M.S.E. in Engineering (ELEG)
M.S.Tc.E. in Telecommunications Engineering (TCEG)
Ph.D. in Engineering (ELEG)

College of Engineering (ENGR)
M.S.E. in Engineering (ENGR)
Ph.D. in Engineering (ENGR)

Department of English (ENGL)
M.A. in English (ENGL)
M.F.A. in Creative Writing (CRWR)
Ph.D. in English (ENGL)

Department of Entomology (ENTO)
M.S. in Entomology (ENTO)
Ph.D. in Entomology (ENTO)

Department of Finance
Ph.D. in Business Administration (BADM)

Department of Food Science (FDSC)
M.S. in Food Science (FDSC)
Ph.D. in Food Science (FDSC)

Department of Foreign Languages (FLAN)
M.A. in French (FREN)
M.A. in German (GERM)
M.A. in Spanish (SPAN)

Department of Geosciences (GEOS)
M.A. in Geography (GEOG)
M.S. in Geology (GEOL)

Department of Health Science, Kinesiology, Recreation, & Dance (HKRD)
M.A.T. in Physical Education (PHED)
M.Ed. in Physical Education (PHED)
M.Ed. in Recreation (RECR)
M.S. in Health Science (HLSC)
M.S. in Kinesiology (KINS)
Ed.D. in Education (RECR)
Ph.D. in Health Science (HLSC)
Ph.D. in Kinesiology (KINS)

Department of History (HIST)
M.A. in History (HIST)
Ph.D. in History (HIST)

Department of Horticulture (HORT)
M.S. in Horticulture (HORT); (See also, Ph.D. in Plant Science)

School of Human Environmental Sciences (HESC)
M.S. in Human Environmental Sciences (HESC)

Department of Industrial Engineering (INEG)
M.S.O.M. in Operations Management (OPMG)
M.S.E in Engineering (INEG)
M.S.I.E. in Industrial Engineering (INEG)
M.S.O.R. in Operations Research (ORES)
Ph.D. in Engineering (INEG)

Department of Information Systems (ISYS)
M.I.S. in Information Systems (INSY)
Ph.D. in Business Administration (BADM)

Walter J. Lemke Department of Journalism (JOUR)
M.A. in Journalism (JOUR)

Department of Management (MGMT)
Ph.D. in Business Administration (BADM)

Department of Marketing and Logistics (MKTL)
M.T.L.M. in Transportation and Logistics Management (TLOG)
Ph.D. in Business Administration (BADM)

Department of Mathematical Sciences (MASC)
M.A. in Secondary Mathematics (SMTH)
M.S. in Mathematics (MATH)
M.S. in Statistics (STAT)
Ph.D. in Mathematics (MATH)

Department of Mechanical Engineering (MEEG)
M.S.M.E. in Mechanical Engineering (MEEG)
M.S.E. in Engineering (MEEG)
Ph.D. in Engineering (MEEG)

Department of Music (MUSC)
Graduate Certificate in Advanced Instrumental Performance (non-degree) (MUSC)
M.M. in Music (MUSC)

Eleanor Mann School of Nursing (NURS)
M.S.N. in Nursing (NURS)

Department of Philosophy (PHIL)
M.A. in Philosophy (PHIL)
Ph.D. in Philosophy (PHIL)

Department of Physics (PHYS)
M.A. in Physics (PHYS)
M.S. in Applied Physics (APHY)

M.S. in Physics (PHYS)
Ph.D. in Physics (PHYS)

Department of Plant Pathology (PLPA)
M.S. in Plant Pathology (PLPA); (See also, Ph.D. in Plant Science)

Department of Political Science (PLSC)
M.A. in Political Science (PLSC)
M.P.A. in Public Administration (PADM)
J.D./M.A., dual degree
J.D./M.P.A., dual degree

Department of Poultry Science (POSC)
M.S. in Poultry Science (POSC)
Ph.D. in Poultry Science (POSC)

Department of Psychology (PSYC)
M.A. in Psychology (PSYC)
Ph.D. in Psychology (PSYC)

Department of Rehabilitation, Human Resources and Communication Disorders (RHRC)
M.A.T. in Vocational Education (VOED)
M.Ed. in Workforce Development Education (WDED)
M.S. in Communication Disorders (CDIS)
M.S. in Rehabilitation (RHAB)
Ed.D. in Education (ADED) (Ed.D. in Workforce Development Education pending approval by the Arkansas Department of Higher Education.)
Ed.D. in Education (VOED)
Ph.D. in Rehabilitation (RHAB)

School of Social Work (SCWK)
Master's of Social Work (SCWK)

Department of Sociology and Criminal Justice (SOCI)
M.A. in Sociology (SOCI)

Inderdepartmental Degree Program
Ph.D. in Food Science (ANSC, FDSC, HESC, HORT)

Interdisciplinary Certificate and Degree Programs
Certificate Program:
Gerontology (GERO)
Degree Programs:
M.S. in Cell & Molecular Biology (CEMB)
M.A. in Comparative Literature and Cultural Studies (CPLT)
M.S. in Microelectronics-Photonics (MEPH)
M.S. in Space & Planetary Sciences (SPAC)
M.F.A. in Translation (TRAN)
Ph.D. in Cell & Molecular Biology (CEMB)
Ph.D. in Comparative Literature and Cultural Studies (CPLT)
Ph.D. in Environmental Dynamics (ENDY)
Ph.D. in Microelectronics-Photonics (MEPH)
Ph.D. in Plant Science (PTSC)
Ph.D. in Public Policy (PUBP)
Ph.D. in Space & Planetary Sciences (SPAC)

University of Arkansas Clinton School (UACS)
Certificate in Public Service (non-degree)
Master of Public Service (UACS)

The Graduate School
Objectives, Regulations, Degrees

The Graduate School is an autonomous organizational unit, whose Dean is responsible to the Provost/Vice Chancellor for Academic Affairs. The Graduate Dean has authority for all matters pertaining to graduate education and concerning graduate students. The Mission Statement and Goals of the Graduate School may be found in the Graduate School Handbook, available on the World Wide Web at http://www.uark.edu/grad/.

MISSION STATEMENT

The Graduate School assists post-baccalaureate students with the opportunity to further their educational goals through programs of study, teaching, and research in an environment that promotes freedom of expression, intellectual inquiry, and professional integrity. Additionally, the Graduate School assists the development of degree programs that are relevant and responsive to the needs of its students and the students' communities -- state, nation and world -- and the demands of technology, while maintaining a high standard of excellence in graduate education.

CORE VALUES

To achieve our goals, the Graduate School staff members believe that in all aspects of our work, we begin with a commitment to promoting graduate education at the University of Arkansas. Our work is based on a firm commitment to excellence, tempered by kindness and compassion. We are an advocate for the graduate student. However, in order to maintain a reputation for quality, which will enhance students' employment opportunities and increase the value of their degrees, we are also required to set and enforce policies. We seek and celebrate diversity of all kinds, within the Graduate School staff and the graduate student population. We see ourselves as a service unit, with a primary commitment to building graduate education and research consistent with the best practices in the nation. As a service unit, we strive to be accessible to all students, and we hold a student-centered, solution-oriented, cooperative and progressive orientation. We value integrity and respect as the foundation of our work, and we believe deeply in the value of freedom of expression. Our commitment extends from the University to the city of Fayetteville, to the state, nation, and world.

ADMISSION

Anyone who wishes to earn graduate-level credit, whether as a degree-seeking or non-degree-seeking student, must make formal application to, and be officially admitted by the Graduate School.

The Graduate School offers two classifications of admission:

1. DEGREE-SEEKING
This enrollment will allow degree credit to be earned if the degree program also accepts the student.

2. NON-DEGREE STANDING
This enrollment will not lead to a degree.

Application. Applications for admission to the Graduate School must be accompanied by a $40 application fee ($50.00 for international applicants), which is not refundable and will not apply against the general registration fee if the applicant enrolls. Applicants are encouraged to use our on-line application procedure. Alternatively, the application form may be obtained from our Web page at http://www.uark.edu/grad, or the application form may be obtained from and submitted directly to:

GRADUATE SCHOOL ADMISSIONS OFFICE
180 DICX
University of Arkansas
747 W. Dickson Street, #8
Fayetteville, AR 72701
Telephone: 479-575-6246

Transcripts. It is the responsibility of those applicants who desire full graduate standing to request each college or university which the student has previously attended to send directly to the Graduate School Admissions Office two official copies of the student's academic record including all courses, grades, and credits attempted and indication of degree(s) earned.

Note: The fact that courses completed at one institution may be included on a transcript from another institution will not suffice; official transcripts must be received from each institution previously attended. However, applicants with an earned post-baccalaureate graduate degree (excluding professional degrees) from a regionally accredited institution may submit two official copies of the transcript conferring the baccalaureate degree and the transcript confirming the post-baccalaureate degree. The Graduate School Admissions Office does not require transcripts from every institution attended in pursuit of the baccalaureate degree, although a degree program may require this.

All transcripts become the property of the University of Arkansas Graduate School and will not be released to the applicant or to any other person, institution, or agency.

Deadlines. The University should receive all application materials, including all official transcripts, at least one month prior to the date of registration. Deadlines for priority consideration are: Fall semester, August 1; Spring semester, December 1; Summer sessions, April 15. Many departments/programs have earlier application deadlines. (See deadlines for international students, below.)

Previously Enrolled or Currently Enrolled at Fayetteville. For those previously enrolled or currently enrolled at the University of Arkansas, Fayetteville, the Graduate School obtains transcripts from the Registrar's Office. For a graduate of the University of Arkansas, Fayetteville (baccalaureate degree), the only transcripts required are those from the University of Arkansas, Fayetteville, and those from each institution attended after completing the University of Arkansas, Fayetteville, degree. Anyone who was previously enrolled but who is not currently enrolled in the University of Arkansas Graduate School is considered a "readmission" and is required only to submit an Application for Admission (no fee) and official transcripts from institutions attended after the University of Arkansas Graduate School enrollment. (See Admission Classification: Readmission.)

Admission is for a Specific Semester Only. Applicants who wish to change their date of entry after submitting an application must notify the Graduate School Admissions Office; applicants who have already been admitted should also notify the program in which they plan to major. Application materials for applicants who apply for admission but who do not subsequently enroll will be retained by the Graduate School Admissions Office for two calendar years from the date of the applicant's original proposed semester of entry. However, applicants must file a new Application for Admission (no fee) to notify the Graduate School of their request for reconsideration. Applicants who are admitted but do not enroll for two years or more after admission must submit an application for admission, application fee, and have two official copies of the student's academic record sent from each college or university attended and follow procedures for initial admission.

Admission to Graduate Standing. Official notice of the decision concerning admission will be sent from the Graduate School. Admission will not be granted until all requirements are met, and graduate credit will not be granted retroactively except as specified in the Retroactive Graduate Credit Policy (see page 21). Further, admission to graduate standing does not automatically constitute admission to a specific program of study leading to a graduate degree. Therefore, in addition to satisfying the general requirements of the Graduate School, applicants must comply with the specific requirements and have the approval of the program in which they desire to pursue graduate study. It should be emphasized that students may not earn graduate credit in any course unless they have been admitted to the Graduate School.

Adviser. At the time of admission to a degree program of the Graduate School, the student is assigned to a major adviser. The appointment of the adviser is made in the student's major program and is determined primarily by the student's particular areas of interest in the field. Detailed information regarding the student's program of study may be secured from the appropriate department chairperson or program director.

Non-Native Speakers of English. Those applicants, regardless of citizenship, whose first language is not English, must submit a minimum score of 6.5 on the International English Language Testing System (IELTS) or 550 on the paper-based or 213 on the computer-based or 80 on the Internet-based Test of English as a Foreign Language (TOEFL), taken within the preceding two years, unless they have received a graduate degree from an accredited U.S. graduate school, or they have demonstrated an acceptable level of language proficiency as defined in the Graduate School Handbook located on the Graduate School Web site. Individual departments may have higher requirements, and reference should be made to program descriptions. Resident aliens must submit a copy of their Resident Alien card with their application. International applicants must have all material submitted by April 1 for fall semester admission, by October 1 for the spring semester, and by March 1 for the summer session, but it is recommended that all materials required for application be received by the admissions office at least nine months before the applicant wishes to begin his/her studies. International applicants must be accepted to a program of study as a condition to being granted admission to the Graduate School and must meet the requirements for regular admission status unless holding a degree from the University of Arkansas.

Non-native speakers of English, regardless of citizenship, must demonstrate competency in spoken English by submitting a test score of at least 7 on the IELTS (speaking) sub-test, 50 on the Test of Spoken English (TSE), 26 on the Internet-based TOEFL (speaking) sub-test or "pass" on the Spoken Language Proficiency Test (SLPT) to be eligible for a graduate assistantship that requires direct contact with students in a teaching or tutorial role.

English Language Use by Non-Native Speakers. Applicants, regardless of citizenship, whose first language is not English and who are admitted to graduate study at the University of Arkansas, are required to present an acceptable score on one of the following tests: TOEFL (TWE or Essay), IELTS (writing), GRE (analytical writing), GMAT (analytical writing) or ELPT (writing). Depending upon exam scores, a student may be required to take one or more EASL course during their first term of study. Students may be required to take the English Language Placement Test (ELPT) prior to the beginning of classes in their first term of study. Non-native speakers in the following categories are exempt from this requirement:

1. Graduate students who earned bachelor's or master's degrees in U.S. institutions or in foreign institutions where the official and native language is English;
2. Graduate students with a Test of Written English (TWE) score of 5.0 or IELTS (writing) score of 7.0.
3. Graduate students with a 4.5 on the analytical writing portion of the GRE or GMAT.

Diagnostic and placement testing is designed to test students' ability to use English effectively in an academic setting, and its purpose is to promote the success of non-native speakers in completing their chosen course of study at the University of Arkansas. Test results provide the basis for placement into English as a Second Language (EASL) support courses or course sequences. Courses are offered by the Department of Foreign Languages for those students whose language skills are diagnosed as insufficient for college work at the level to which they have been admitted (undergraduate or graduate study). Credit in EASL courses does not count toward University of Arkansas degrees. Non-native speakers diagnosed as having language competence sufficient for their level of study will not be required to enroll in EASL courses.

The ELPT is administered by Testing Services during New Student Orientation and there is a $10 charge. Graduate students assessed course work as a result of performance on the ELPT, TOEFL Essay, IELTS writing, GRE or GMAT analytical writing will be required to complete the EASL course(s) to support initial course work taken in their fields. Graduate departments/degree programs will have the discretion to waive either the requirement for the language evaluation or the required language courses.

The publication, "International Student Information," is available from the Graduate and International Admissions Office, 180 DICX, University of Arkansas, 747 W. Dickson Street, #8, Fayetteville, Arkansas 72701.

Classifications of Admission to Graduate Standing

Full Graduate Standing, Regular Admission. To be considered for full graduate standing, regular status, applicants must have earned a baccalaureate or a master's degree from the University of Arkansas, Fayetteville, or from a regionally accredited institution in the United States with requirements for the degrees substantially equivalent

to those of this University, or from a foreign institution with similar requirements for the degrees. ADMISSION TO GRADUATE STANDING DOES NOT AUTOMATICALLY CONSTITUTE ACCEPTANCE TO A PROGRAM OF STUDY LEADING TO A GRADUATE DEGREE. To pursue a graduate degree, a person must also be accepted in a program of study after gaining regular admission to graduate standing. International applicants cannot be admitted to graduate standing unless they are also accepted by a degree program at the same time.

Persons who achieve regular admission but are not initially seeking a graduate degree (non-degree) and who subsequently decide to pursue a degree must apply for and be accepted in a degree program by the Graduate School. A student with regular graduate standing who has not been accepted in a program of study leading to a specific graduate degree may take no more than 12 semester hours of graduate-level courses that can be counted toward the requirements for a graduate degree (six for graduate certificate programs). At the time of acceptance in a degree program, the chair of the appropriate department or program director will recommend to the Graduate School which courses previously taken, if any, are to be accepted in the degree program.

Requirements for admission to graduate standing and acceptance in a program of study leading to a graduate degree are:

1. For admission to graduate standing:
   a. A grade-point average of 3.0 or better (A=4.00) on the last 60 hours of course work taken prior to receipt of a baccalaureate degree from a regionally accredited institution of higher education; or
   b. A grade-point average between 2.50 and 2.99 on the last 60 hours of course work taken prior to receipt of a baccalaureate degree from a regionally accredited institution of higher education and a satisfactory score on the Graduate Record Examinations general test, the Miller Analogies Test, or a similar test acceptable to the Graduate Dean; or
   c. A grade-point average of 3.0 or better on all course work taken prior to receipt of a baccalaureate degree from a regionally accredited institution of higher education.
   d. Conferral of a post-baccalaureate graduate degree (excluding professional degrees) from a regionally accredited institution.
2. For acceptance to a graduate degree program the requirements are as follows:
   a. Fulfillment of either 1.a or 1.c, and recommendation of the chair of the department or program offering instruction for the degree program; or
   b. Fulfillment of 1.b, recommendation of the chair of the department or program offering instruction for the degree program and approval of the Graduate Dean. The student must also meet any other conditions that may be specified by the faculty of the department.

Any other consideration for admission must be by individual petition to the Graduate Dean and, where pertinent, a recommendation from the appropriate program chair. Each petition will be considered on its own merits, case by case. Program requirements should be considered the minimum for admission to a degree program but do not guarantee admission. That is, fully qualified applicants who are accepted by the Graduate School will not necessarily be accepted into the degree program of their choice. It is the responsibility of the program faculty to allocate program resources in the most effective manner. To accomplish this, the program may not be able to accept every qualified applicant.

Non-Degree Seeking. If a student meets all of the requirements for regular admission to the Graduate School but chooses not to pursue a degree, he/she may be admitted as non-degree seeking. If the student subsequently chooses to pursue a degree, only 12 of the hours taken as a non-degree-seeking student may be used to fulfill degree requirements, and those 12 hours must be approved by the advisory committee.

Non-Consecutive One Term Admission, NON-DEGREE Standing. Applicants who desire admission standing allowing them to enroll in non-consecutive single semesters must obtain from the Graduate School Admissions Office and must sign a statement of understanding. Students admitted to such non-consecutive one-term admissions must understand that any enrollment taken in this classification will not normally carry degree credit. Transcripts are not required for applicants seeking this non-degree standing.

Letter of Good Standing. A graduate student who is in good standing at another regionally accredited institution in the United States may be given admission (non-degree status) to the Graduate School for one semester upon submission of an Application for Admission and a letter of good standing from the Dean of the Graduate School at that institution. If, sometime in the future, the student should wish to pursue a degree in the University of Arkansas Graduate School, it will be necessary to follow the normal procedures for admission and to have official transcripts sent from each institution previously attended. Graduate courses transferred and used for requirements for a degree at another university cannot be used for a graduate degree at this institution.

Readmission. *Readmission to the Graduate School is not automatic*. Students who have been enrolled in the Graduate School within the five preceding academic years but have not enrolled in the immediately preceding semester will be readmitted if:

1. The student has earned at least a 2.85 cumulative grade-point average on all graduate credits attempted during all previous enrollments;
2. A new Application for Admission form (no fee) is filed prior to the desired registration date (preferably, at least one month prior to that date);
3. The Graduate School has received two official transcripts of all course work attempted at other institutions subsequent to the previous enrollment in the University of Arkansas Graduate School;
4. The student's graduate status at the end of the previous enrollment was "good standing."

Students who have been previously admitted to and enrolled in the Graduate School but have no enrollment within the five years preceding the semester of readmission and who wish to be readmitted to pursue a graduate degree, may be considered for readmission upon a petition by the degree program to the Graduate School. Such students should contact the department/program head/director or graduate coordinator to request readmission. The department/program head/director, graduate coordinator, or major adviser of the student will petition the Director of Graduate Admissions, using the form "Request for an Exception to the Admissions Requirements of the Graduate School," and will specify whether all of the student's previous course work and grade points will be forfeited. (Note: Neither the degree program nor the student may petition to forfeit only some of the previous course work and grade points; rather, all or none of the course work may be forfeited.) If all of the previous course work and grade points will be forfeited, a notation on the transcript next to these courses will state: "This course may not be used for graduate credit at the University of Arkansas." If the previous course work and grade points will not be forfeited, the student's major adviser must petition for a time extension. Please see the Time Extension Policy.

Readmission for non-degree seeking students: Non-degree-seeking students who have previously been enrolled in the Graduate School but have had a lapse in their enrollment will follow the procedures stated above, or in the policy pertaining to non-consecutive one-term admissions, whichever is most appropriate.

Readmission to the Graduate School under any other circumstances will be considered and decided on an individual basis. Students interested in obtaining such readmission should contact the Graduate School.

Students who were not enrolled in the Spring semester, but who were enrolled for the Summer session will have registration materials available for the Fall semester should they wish to continue their registration.

Retroactive Graduate Credit

Graduate students fully admitted into a degree program may request that up to twelve hours of courses taken in the final semester of their undergraduate degree count toward their graduate degree, if these courses were taken on the University of Arkansas, Fayetteville campus. These courses may not have been used for the undergraduate degree, must be approved by the student's advisory committee, and must be at the 5000 level or above. Petition will be by the student's advisory committee or major professor to the Graduate School.

If the student's advisory committee wishes to accept courses at the 4000 level towards the graduate degree, when those courses were taken in the last semester of a student's undergraduate degree at the University of Arkansas, Fayetteville, the committee may petition the Graduate School. The petition must include an explanation of why the committee considers these courses to meet graduate degree requirements and expectations for graduate-level work. The instructors for these courses must have had graduate faculty status, and these courses may not have been used for the undergraduate degree.

Courses at the 3000 level taken before the student is fully admitted to the Graduate School may not be used to fulfill graduate degree requirements.

Courses offered by institutions other than the University of Arkansas, Fayetteville, may not be counted toward the graduate degree requirements in this way.

If a program wishes to place a senior-level undergraduate student on a graduate assistantship, the Graduate Dean will consider these appointments on a case-by-case basis. The program must stipulate that the student will be entering one of its graduate programs as soon as the undergraduate degree is completed, and the student must be within six hours of completing the undergraduate degree. An undergraduate student may not hold a graduate assistantship, even under these conditions, for more than one semester.

ADMISSION TO GRADUATE CENTERS

In an attempt to fulfill the recognized need for graduate education for Arkansas residents who find it impossible or inconvenient to attend classes at Fayetteville, the University of Arkansas Graduate School offers selected graduate-level courses at graduate centers throughout the state.

All courses and instructors at these centers have been individually evaluated by the University of Arkansas Graduate Council and are subject to the same standards of quality that apply to graduate faculty and graduate programs at Fayetteville.

Similarly, those desiring to enroll in these courses must follow the same admission procedures and are subject to the same admission criteria as persons admitted at Fayetteville. There are no exceptions or deviations from these policies and procedures. Admission materials, including all official transcripts, should be received in the Graduate School at least one month prior to the requested semester of entry. (See section on "Admission.")

For more comprehensive information regarding format of instruction, schedule of classes, enrollment and registration, fees, etc., contact: Director of Continuing Education, Number 2, University Center, Fayetteville, Arkansas 72701.

Those intending to enroll for classes at the Graduate Resident Center for Engineering (University of Arkansas at Little Rock, host campus) must submit application for admission to the Graduate School at least one month prior to initial registration through:

Graduate Resident Center for Engineering
3189 Bell Engineering Center
University of Arkansas
Fayetteville, AR 72701
Telephone:1-800-423-1176 or 479-575-6015

To assure timely processing of the Application for Admission, a check or money order made to the University of Arkansas for the $40 application fee must accompany the application when submitted to the Graduate School.

Contact the above address for information pertaining to classes, enrollment, fees, etc.

GRADUATE CENTERS

The University of Arkansas offers graduate-level courses for residence credit at Graduate Centers located off the Fayetteville campus. There are two types of graduate centers currently in existence: Twelve-Hour Graduate Centers and Graduate Resident Centers.

Graduate courses completed at Graduate Resident Centers may be used to satisfy course work requirements for any graduate degree. Any graduate credit course offered by the University of Arkansas, Fayetteville, via distance education (regardless of class sites) will be counted as residence credit.

Twelve-Hour Graduate Centers. The University of Arkansas, Fayetteville, offers graduate courses at off-campus locations. At those locations, not defined as Graduate Resident Centers for specified degrees, a student may complete a maximum of twelve semester hours of courses for residence credit applicable to the master's degree requirements at the University of Arkansas.

To obtain graduate credit for courses offered at off-campus locations, the student must gain admission to the University of Arkansas, Fayetteville, Graduate School. If graduate credit so received is to be applied to a specific master's degree, the student must be accepted in a program of study leading to that degree. Graduate courses completed, but not applicable to the requirements for the master's degree the student is pursuing, will not be accepted as part of the 30-week residence required for that degree.

Graduate Resident Centers. The University of Arkansas offers graduate level courses for residence credit off the Fayetteville campus. All of the residence requirements for some graduate degrees may be completed off campus at Graduate Resident Centers as indicated in the following list.

FORT SMITH GRADUATE RESIDENT CENTER

All course requirements for the Master of Business Administration degree may be completed at the Graduate Resident Center in Fort Smith.

GRADUATE RESIDENT CENTER FOR ENGINEERING IN CENTRAL ARKANSAS

All requirements for the Master of Science in Engineering (M.S.E.) degree may be completed at the Graduate Resident Center for Engineering, University of Arkansas at Little Rock as host campus.

GRADUATE RESIDENT CENTERS AT MILITARY BASES AND THE BLYTHEVILLE AND CAMDEN GRADUATE RESIDENT CENTERS

The Master of Science in Operations Management (M.S.O.M.) is offered at Graduate Resident Centers established at the Naval Support Activity Mid-South in Millington, Tennessee; the Little Rock Air Force Base in Jacksonville; the Hurlburt Field Air Force Base in Florida; and in Blytheville and Camden. For further informa-

tion on this degree program and a description of courses offered, see page 140.

LITTLE ROCK GRADUATE RESIDENT CENTER

All of the course requirements for the Master of Science degree in rehabilitation may be completed at the Graduate Resident Center in Little Rock.

MID-SOUTH CENTER OF LEADERSHIP TRAINING

All course requirements for the Master of Science in human environmental sciences may be completed at the Mid-South Center of Leadership Training in Little Rock.

PHILLIPS COMMUNITY COLLEGE OF THE UNIVERSITY OF ARKANSAS

All course requirements for the Master of Science in human environmental sciences and the Educational Specialist degree with a specialization in educational administration may be completed at the Graduate Resident Center at the Phillips Community College of the University of Arkansas, Helena.

PINE BLUFF GRADUATE RESIDENT CENTER

All requirements for the Educational Specialist degree with a specialization in educational administration may be completed at the Graduate Resident Center in Pine Bluff.

UNIVERSITY OF ARKANSAS AT LITTLE ROCK

All course requirements for the Master of Science in human environmental sciences may be completed at the University of Arkansas at Little Rock.

UNIVERSITY OF ARKANSAS CLINTON SCHOOL

All course requirements for the Master of Public Service may be completed at a combination of the University of Arkansas Clinton School, the University of Arkansas at Little Rock, the University of Arkansas for Medical Sciences, and the University of Arkansas, Fayetteville.

UNIVERSITY OF ARKANSAS COMMUNITY COLLEGE AT BATESVILLE

All course requirements for the Master of Science in human environmental sciences may be completed at the Graduate Resident Center at the Phillips Community Center of the University of Arkansas.

UNIVERSITY OF ARKANSAS COMMUNITY COLLEGE AT HOPE

All course requirements for the Master of Science in human environmental sciences and the Educational Specialist degree with a specialization in educational administration may be completed at the Graduate Resident Center at the University of Arkansas Community College at Hope.

UNIVERSITY OF ARKANSAS EXTENSION BUILDING

All course requirements for the Master of Science in human environmental sciences may be completed at the Graduate Resident Center at the University of Arkansas Extension Building in Little Rock.

HONOR CODE FOR THE GRADUATE SCHOOL

The mission of the Graduate School is to provide post-baccalaureate students with the opportunity to further their educational goals through programs of study, teaching, and research in an environment that promotes freedom of expression, intellectual inquiry, and professional integrity. This mission is only possible when intellectual honesty and individual integrity are taken for granted.

The graduate student at the University of Arkansas is expected to: a) know and abide by the regulations for all students, as described in the *Student Handbook* published by the Vice Chancellor for Student Affairs, and b) know and abide by the regulations contained within the "Academic Honesty Policy for Graduate Students" and the "Research Misconduct Policy." It is expected that graduate students will refrain from all acts of academic and research dishonesty and will furthermore report to the Graduate School any acts witnessed.

The pledge of the Honor Code is this: "On my honor as a graduate student at the University of Arkansas, I certify that I will neither give nor receive inappropriate assistance on the work I do for my degree." Students will be asked to sign this pledge when they are admitted to the Graduate School. Faculty also may require students to sign this pledge before completing the requirements of a course or a program of study.

REGISTRATION AND RELATED TOPICS

Students must register during one of the formal registration periods. Graduate students, new, returning, or currently enrolled, may register during the priority registration held each semester for the following semester. Students who have not already registered should register during the open registration session. For information on registration, consult the Schedule of Classes or visit the World Wide Web at http://www.uark.edu/admin/regrinfo/.

Enrollment Limits

Under ordinary circumstances, graduate registration is limited to 18 hours for any one semester in the fall or spring, including undergraduate courses and courses audited. Registration above 15 hours must be approved by the Graduate Dean. For registration in the summer, the enrollment limit is 12 hours without approval by the Graduate Dean.

Registration for Audit

When a student audits a course, that student must register for audit, pay the appropriate fees, and be admitted to class on a space-available basis. Students not formally admitted to a degree program will not have priority for auditing a class. The instructor shall notify the student of the requirements for receiving the mark of "AU" for the course being audited. The instructor and the student's dean may drop a student from a course being audited if the student is not satisfying the requirements specified by the instructor. The student is to be notified if this action is taken. The only grade or mark that can be given is "AU." The Graduate School does not normally pay tuition for audited classes for students on assistantship.

Registration Out of Career

Students who wish to enroll in classes for credit outside of their career (e.g. graduate students who wish to enroll in undergraduate classes for undergraduate credit) should print the appropriate form from the Graduate School Web site (http://www.uark.edu/grad), obtain the required signatures, and return the form to the office indicated on the form. Students are not able to register themselves out of career.

Proper Address of Students

All students are responsible for maintaining their addresses with the University and to report any change of address promptly to the Office of the Registrar or to the Graduate School. Failure to do so may result in undelivered grades, registration notices, invoices, invitations, or other official correspondence and announcements.

Identification Cards

Identification cards are made by the Division of Student Services during each registration period and at scheduled times and places during the year. The I.D. card can be used as a debit card for purchases at the Bookstore or the Union Servery.

Adding and Dropping Courses

A currently enrolled student who has registered during the advance registration period should make any necessary or desired schedule adjustments such as adding or dropping courses or changing course sections during the schedule-adjustment period scheduled for the same semester. Students may also add or drop courses during the first five class days of a semester. Students who drop classes by the end of the first week of classes in the fall and spring will have their fees adjusted. (Refer to the Treasurer's Office Web site for summer dates.) Fee adjustments are not done for classes dropped after the first week of classes. Drops and Withdrawals are two different functions. In a drop process the student remains enrolled. The result of the withdrawal process is that the student is no longer enrolled for the term. The two functions have different fee adjustment policies. Fee adjustment deadlines for official withdrawal are noted below.

A student may drop a course during the first 10 class days of the fall or spring semester without having the drop shown on the official academic record. After the first 10 class days, and before the drop deadline of the semester, a student may drop a course, but a mark of "W," indicating the drop, will be recorded. A student may not drop a full-semester course after the Friday of the tenth week of classes in a semester.

Drop-add deadlines for partial semester courses and summer classes are in the schedule of classes.

Withdrawal from Registration

Withdrawing from the University means withdrawing from all classes that have not been completed up to that time. A student who leaves the University voluntarily before the end of the semester or summer term must file and have accepted by his or her academic dean and the Registrar a Petition for Withdrawal from Registration. Withdrawal must occur prior to the last class day of a semester. Students who do not withdraw officially from a class that they fail to complete will receive an "F" in that class.

Attendance

Students are expected to be diligent in the pursuit of their studies and in their class attendance. Students have the responsibility of making arrangements satisfactory to the instructor regarding all absences. Such arrangements should be made prior to the absence if possible. Policies of making up work missed as a result of absence are at the discretion of the instructor, and students should inform themselves at the beginning of each semester concerning the policies of their instructors.

Full-Time Status

Enrollment in nine semester hours (not including audited courses) is considered full-time for graduate students not on assistantship. For graduate assistants or students with research fellowships on 50 percent appointment or more, six semester hours (not including audited courses) of enrollment is considered full-time in the fall and spring semesters. Graduate assistants who are on a 50% appointment for a six-week summer term must earn at least three hours of graduate credit during the summer. However, these credits do not have to be earned in the same session as the appointment, and may be taken at any time during the summer. Tuition and fees for graduate assistants on 50% appointments for a six-week summer term will be paid up to a maximum of 4 hours. Students not on graduate assistantships or fellowships must be enrolled in six hours (not including audited courses) to be full time in the summer.

Continuous Enrollment

After a doctoral student has passed the candidacy examinations, the student must register for at least one hour of dissertation each semester and one hour during the summer session until the work is completed, whether the student is in residence or away from the campus. For each semester in which a student fails to register without prior approval of the Dean of the Graduate School, a registration of three hours will be required before the degree is granted. Please see the Graduate School Registration and Leave of Absence Policy.

Use of Electronic Resources of the Library

The use of electronic resources of the University Libraries from a location outside of the library is only available to enrolled students. Students who are enrolled in the spring semester and have pre-registered for the succeeding fall semester may have access to these resources during the intervening summer. Students who are not required to be enrolled for other reasons, who are not pre-registered for the fall, and who wish to use the library resources during the summer must be enrolled in at least one hour of credit in any one of the summer sessions.

GRADES AND MARKS

Final grades for courses are "A," "B," "C," "D," and "F" (except for courses taken in the Bumpers College of Agricultural, Food, and Life Sciences). No credit is earned for courses in which a grade of "F" or, beginning with students admitted to the Graduate School in Fall 2001 or after, "D" is recorded.

A final grade of "F" shall be assigned to a student who is failing on the basis of work completed but who has not completed all requirements. The instructor may change an "F" so assigned to a passing grade if warranted by satisfactory completion of all requirements.

A mark of "I" may be assigned to a student who has not completed all course requirements, if the work completed is of passing quality. An "I" so assigned may be changed to a grade provided all course requirements have been completed within 12 weeks from the beginning of the next semester of the student's enrollment after receiving the "I." If the instructor does not report a grade within the 12-week period, the "I" shall be changed to an "F." When the mark of "I" is changed to a final grade, this shall become the grade for the semester in which the course was originally taken.

A mark of "AU" (Audit) is given to a student who officially registers in a course for audit purposes (see Registration for Audit).

A mark of "CR" (credit) is given for a course in which the University allows credit toward a degree, but for which no grade points are earned. The mark "CR" is not normally awarded for graduate-level courses but may be granted for independent academic activities. With departmental (or program area) approval and in special circumstances, up to a maximum of six semester hours of "CR" may be accepted toward the requirements for a graduate degree.

A mixing of course letter grades and the mark "CR" is permitted only in graduate-level courses in which instruction is of an independent nature.

A mark of "R" (Registered) indicates that the student registered for master's thesis or doctoral dissertation. The mark "R" gives neither credit nor grade points toward a graduate degree.

A mark of "S" (Satisfactory) is assigned in courses such as special problems and research when a final grade is inappropriate. The mark "S" is not assigned to courses or work for which credit is given (and thus no grade points are earned for such work). If credit is awarded

upon the completion of such work, a grade or mark may be assigned at that time and, if a grade is assigned, grade points will be earned.

A mark of "W" (Withdrawal) will be given for courses from which students withdraw after the first 10 class days of the semester and before the drop deadline of the semester.

For numerical evaluation of grades, "A" is assigned 4 points for each semester hour of that grade; "B," 3 points; "C," 2 points; "D," 1 point; and "F," 0 points. Grades of plus and minus are assigned grade-point values in the Bumpers College of Agricultural, Food, and Life Sciences.

ACADEMIC GRIEVANCE PROCEDURES FOR GRADUATE STUDENTS

The Graduate School of the University of Arkansas recognizes that there may be occasions when a graduate student has a grievance about some aspect of his/her academic involvement. It is an objective of this University that such a graduate student may have prompt and formal resolution of his or her personal academic grievances and that this be accomplished according to orderly procedures. Below are the procedures to be utilized when a graduate student has an academic grievance with a faculty member or administrator. If the student has a grievance against another student or another employee of the University, or if the student has a grievance which is not academic in nature, the appropriate policy may be found by contacting the Office of Affirmative Action or the office of the Graduate Dean. For policies and procedures pertaining to conduct offenses, consult the Code of Student Life.

Note: Master's students in the Graduate School of Business should follow the grievance procedures for that School.

Definition of Terms

Academic grievance. An academic grievance means a dispute concerning some aspect of academic involvement arising from an administrative or faculty decision which the graduate student claims is unjust or is in violation of his or her rights. The Graduate School considers any behavior on the part of a faculty member or an administrator, which the student believes to interfere with his/her academic progress, to be subject to a grievance. While an enumeration of the students' rights with regard to their academic involvement is not possible or desirable, we have provided a short list as illustration. However, as in all cases involving individual rights, whether a specific behavior constitutes a violation of these rights can only be decided in context, following a review by a panel of those given the authority to make such a decision.

In general, we consider that the graduate student:

1) has the right to competent instruction;
2) is entitled to have access to the instructor at hours other than class times (office hours);
3) is entitled to know the grading system by which he/she will be judged;
4) has the right to evaluate each course and instructor;
5) has the right to be treated with respect and dignity.

In addition, an academic grievance may include alleged violations of the affirmative action plans of the University as related to academic policies and regulations, as well as disputes over grades, course requirements, graduation/degree program requirements, thesis/dissertation/advisory committee composition, and/or adviser decisions.

Formal academic grievance. An academic grievance is considered formal when the student notifies the Graduate Dean, in writing, that he/she is proceeding with such a grievance. The implications of this declaration are: 1) all correspondence pertaining to any aspect of the grievance will be in writing and will be made available to the Graduate Dean; 2) all documents relevant to the case, including minutes from all relevant meetings, will be part of the complete written record and will be forwarded to the Graduate Dean upon receipt by any party to the grievance; 3) the policy contained herein will be strictly followed; and 4) any member of the academic community who does not follow the grievance policy will be subject to disciplinary actions. Filing a formal academic grievance is a serious matter, and the student is strongly encouraged to seek informal resolution of his/her concerns before taking such a step.

Complete Written Record. The "complete written record" refers to all documents submitted as evidence by any party to the complaint, as subject to applicable privacy considerations.

Note: Because the tape recordings of committee meetings may contain sensitive information, including private information pertaining to other students, the tape or a verbatim transcription of the tape will not be part of the complete written record. However, general minutes of the meetings, documenting the action taken by the committees, will be part of the complete written record.

Graduate student. Under this procedure, a graduate student is any person who has been formally admitted into the Graduate School of the University of Arkansas, Fayetteville, and who is/was enrolled as a graduate-level student at the time the alleged grievance occurred.

Working Days. Working days shall refer to Monday through Friday, excluding official University holidays.

Procedures

Note: Master's students in the Graduate School of Business should follow the grievance procedures for that School.

1. Individuals should attempt to resolve claimed grievances first with the person(s) involved, within the department, and wherever possible, without resort to formal grievance procedures. The graduate student should first discuss the matter with the faculty member involved, with the faculty member's chairperson or area coordinator, or with the Graduate Dean. The student's questions may be answered satisfactorily during this discussion. The student may also choose to contact the Office of Student Mediation and Conflict Resolution or, if the grievance is with the departmental chairperson or area coordinator, with the academic dean or the Graduate Dean, for a possible informal resolution of the matter.

2. If a graduate student chooses to pursue a formal grievance procedure, the student shall take the appeal in written form to the appropriate departmental chairperson/area coordinator, and forward a copy to the Graduate Dean. In the case of a grievance against a departmental chairperson or an area coordinator who does not report directly to a departmental chairperson, or in the absence of the chairperson/coordinator, the student will go directly to the dean of the college or school in which the alleged violation has occurred, or to the Graduate Dean. In any case, the Graduate Dean must be notified of the grievance. After discussion between the chairperson/coordinator/dean and all parties to the grievance, option 2a, 2b, or 3 may be chosen.

a. All parties involved may agree that the grievance can be resolved by a recommendation of the chairperson/coordinator/dean. In this case, the chairperson/coordinator/dean will forward a written recommendation to all parties involved in the grievance within 20 working days after receipt of the written grievance. The chairperson/area coordinator/dean is at liberty to use any appropriate method of investigation, including personal interviews and/or referral to an appropriate departmental committee for recommendation.
b. Alternatively, any party to the grievance may request that the departmental chairperson/area coordinator/dean at once refer the request, together with all statements, documents, and information gathered in his or her investigation, to the applicable departmental group (standing committee or all graduate faculty

of the department). The reviewing body shall, within ten working days from the time its chairperson received the request for consideration, present to the department chairperson/coordinator/dean its written recommendations concerning resolution of the grievance. Within ten working days after receiving these recommendations, the department chairperson/area coordinator/dean shall provide all parties to the dispute with copies of the reviewing body's recommendation and his or her consequent written decision on the matter.

3. If the grievance is not resolved by the procedure outlined in step 2, or if any party to the grievance chooses not to proceed as suggested in 2, he/she will appeal in writing to the Dean of the Graduate School. When, and only when, the grievance concerns the composition of the student's thesis/dissertation committee or advisory committee, the Graduate Dean will proceed as described in step 5 (following). In all other cases, whenever a grievance comes to the attention of the Dean of the Graduate School, either as a result of a direct appeal or when a grievance has not been resolved satisfactorily at the departmental/academic dean level, the Dean of the Graduate School will consult with the person alleging the grievance. If that person decides to continue the formal grievance procedure, the Graduate Dean will notify all parties named in the grievance, the departmental chairperson/area coordinator, and the academic dean that a formal grievance has been filed. Within ten working days, the Dean of the Graduate School will: 1) with the consent of the student, appoint a faculty member as the student's advocate, and 2) appoint an ad hoc committee of five faculty members and two graduate students, chosen to avoid obvious bias or partiality, to review the grievance and report to him/her. The Associate Dean of the Graduate School will serve as the chair of the grievance committee and will vote only in the case of a tie. A voting member of the Graduate Council will serve as the non-voting secretary of the committee.

The committee shall have access to witnesses and records, may take testimony, and may make a record by taping the hearing. Its charge is to develop all pertinent factual information (with the exception that the student and faculty member/administrator will not be required to be present in any meeting together without first agreeing to do so) and, on the basis of this information, to make a recommendation to the Graduate Dean to either support or reject the appeal. The Graduate Dean will then make a decision based on the committee's recommendation and all documents submitted by the parties involved. The Graduate Dean's decision, the committee's written recommendation and a copy of its complete written record (excluding those in which other students have a privacy interest) shall be forwarded to the person(s) making the appeal within 20 working days from the date the committee was first convened; copies shall be sent simultaneously to other parties involved in the grievance and to the dean of the college in which the alleged violation occurred. A copy shall be retained by the Graduate School in such a way that the student's privacy is protected.

4. When, and only when, the grievance concerns a course grade and the committee's recommendation is that the grade assigned by the instructor should be changed, the following procedure applies. The committee's recommendation that the grade should be changed shall be accompanied by a written explanation of the reasons for that recommendation and by a request that the instructor change the grade. If the instructor declines, he or she shall provide a written explanation for refusing. The committee, after considering the instructor's explanation and upon concluding that it would be unjust to allow the original grade to stand, may then recommend to the department chair that the grade be changed. The department chair will provide the instructor with a copy of the recommendation and ask the instructor to change the grade. If the instructor continues to decline, the department chair may change the grade, notifying the instructor, the Graduate Dean, and the student of the action. Only the department chair, and only on recommendation of the committee, may change a grade over the objection of the instructor who assigned the original grade. No appeal or further review is allowed from this action. All grievances concerning course grades must be filed within one calendar year of receiving that grade.

5. When, and only when, a student brings a grievance concerning the composition of his/her thesis/dissertation or advisory committee, the following procedure will apply. The Dean of the Graduate School shall meet with the graduate student and the faculty member named in the grievance and shall consult the chair of the committee, the departmental chairperson/area coordinator, and the academic dean, for their recommendations. In unusual circumstances, the Dean of the Graduate School may remove a faculty member from a student's thesis/dissertation committee or advisory committee, or make an alternative arrangement (e.g. assign a representative from the Graduate faculty to serve on the committee). With regard to the chair of the dissertation/thesis committee (not the advisory committee), the Graduate School considers this to be a mutual agreement between the faculty member and the student to work cooperatively on a research project of shared interest. Either the graduate student or the faculty member may dissolve this relationship by notifying the other party, the departmental chairperson, and the Graduate Dean. However, the student and the adviser should be warned that this may require that all data gathered for the dissertation be abandoned and a new research project undertaken, with a new faculty adviser.

6. If a grievance, other than those covered by step 4, is not satisfactorily resolved through step 3 or 5, an appeal in writing and with all relevant material may be submitted for consideration and a joint decision by the Chancellor of the University of Arkansas, Fayetteville, and the Provost/Vice Chancellor for Academic Affairs. This appeal must be filed within 20 working days of receiving the decision of the Graduate Dean. Any appeal at this level shall be on the basis of the complete written record only, and will not involve interviews with any party to the grievance. The Chancellor of the University of Arkansas, Fayetteville, and the Provost/Vice Chancellor for Academic Affairs shall make a decision on the matter within 20 working days from the date of receipt of the appeal. Their decision shall be forwarded in writing to the same persons receiving such decision in step 3. Their decision is final pursuant to the delegated authority of the Board of Trustees.

7. If any party to the grievance violates this policy, he/she will be subject to disciplinary action. When alleging such a violation, the aggrieved individual shall contact the Graduate Dean, in writing, with an explanation of the violation.

GRIEVANCE POLICY AND PROCEDURES FOR GRADUATE ASSISTANTS

Note: Graduate Assistants in the Graduate School of Business should follow the grievance procedures for that School.

Introduction

It is the philosophy of the Graduate School that assistantships are not typical employee positions of the University. This has two implications. First, the sponsor should also serve as a mentor to the student and assist, to the extent possible, in facilitating the student's progress toward his/her degree. Second, any questions concerning performance in or requirements of assistantships shall be directed to the Graduate School or, for master's students in business, to the Graduate School of Business. Note: the term *graduate assistant* will be used to refer to those on other types of appointments as well, such as fellowships, clerkships, etc.

The Graduate School has the following authority with regard to

graduate assistantships:

1. All requests for new positions, regardless of the source of the funds, must be approved by the Graduate School. When the position is approved, the requesting department or faculty member must complete the form "Request for a New Graduate Assistant Position" and submit it to the Graduate School. All proposed changes in duties for existing graduate assistantships must be approved by the Graduate School prior to their implementation.

2. The duty requirements of the graduate assistantship, including the number of hours required, must be approved by the Graduate School. Fifty percent GAs may not be asked to work more than 20 hours per week (Note: this is not limited to time actually spent in the classroom or lab; the 20 hour requirement also pertains to time required to grade/compute results, develop class/lab materials, etc. Moreover, students cannot be asked to work an *average* of 20 hours per week, with 30 hours one week and 10 hours the next, for example. The duty hour requirement is no more than 20 hours per week for a 50 percent appointment. See the *Graduate Handbook*. However, it should also be noted that if the student is engaged in research which will be used in his/her required project, thesis or dissertation, or if the student is traveling to professional meetings, data sources, etc., the student may work more than 20 hours per week.) The duty requirements must complement the degree program of the graduate student and must abide by the philosophy that the first priority of graduate students is to finish their degrees. If a student is assigned to teach, the maximum duty assignment is full responsibility for two three-hour courses per semester.

3. The Graduate School, in consultation with the Graduate Council, has the right to set the enrollment requirements for full-time status for graduate assistants (as well as graduate students in general).

4. The Graduate School sets the minimum stipend for graduate assistantships, but does not have responsibility for setting the actual stipend.

Graduate assistants will be provided with a written statement of the expected duties for their positions, consistent with the duties outlined in the "Request for New Graduate Assistant Position" or any amendments submitted to the Graduate School. A copy of the written statement will be submitted to the Graduate School for inclusion in the student's file.

Graduate assistants may be terminated from their positions at any time, or dismissed for cause (Board Policy No. 405.4). Termination is effected through the giving of a notice, in writing, of that action at least 60 days in advance of the date the employment is to cease. A copy of the notice must be sent to the Graduate Dean.

A graduate assistant has the right to request a review of the termination by the Graduate Dean, following the procedure given below. However, a student should be warned that if the grounds for dismissal are based on any of the following, the only defense to the termination is evidence to show that the charges are not true:

1. The student fails to meet the expectations of the assistantship positions, as outlined in the initial written statement provided to him/her at the beginning of the appointment.

2. The student provides fraudulent documentation for admission to his/her degree program and/or to his/her sponsor in applying for the assistantship position.

3. The student fails to meet certain expectations, which need not be explicitly stated by the sponsor, such as the expectation that: a) the student has the requisite English language skills to adequately perform the duties of the position; b) the student has the appropriate experience and skills to perform the duties of the position; and c) the student maintains the appropriate ethical standards for the position. The Research Misconduct Policy provides one reference source for such ethical standards.

4. The student fails to make good progress toward the degree, as determined by the annual graduate student academic review and defined by program and Graduate School policies.

5. The assistantship position expires.

Definition of Terms

Graduate Assistant. Any graduate student holding a position which requires that the student be admitted to a graduate degree program of the University of Arkansas, regardless of the source of funds, and for whom tuition is paid as a result of that position.

Sponsor. The person responsible for the funding and duty expectations for the graduate assistant.

Formal graduate assistant grievance. Any dispute concerning some aspect of the graduate assistantship, as defined above, which arises from an administrative or faculty decision that the graduate student claims is a violation of his or her rights. The formal graduate assistant grievance does not pertain to cases in which there is a dispute between co-workers.

Violation of graduate assistant's rights. An action is considered a violation of the graduate assistants' rights if: a) it violates Graduate School policy with regard to graduate assistantships; b) it threatens the integrity of, or otherwise demeans the graduate student, regardless of any other consideration; c) it illegally discriminates or asks the graduate assistant to discriminate; d) it requires the student to do something which was not communicated as a condition of holding the assistantship (or the underlying expectations outlined above); e) it terminates the student from an assistantship for behaviors which are irrelevant to the holding of the assistantship or were never included as expectations for the assistantship; f) it requires the student to do something which violates University policy, the law, or professional ethics. Note: It is impossible to state all of the conditions which might constitute a violation of graduate assistants' rights or, conversely, which might defend a respondent against charges of such violations. Such complaints require a process of information gathering and discussion that leads to a final resolution of the matter by those who have been given the authority to do so.

Formal grievance. A grievance concerning graduate assistantships/fellowships is considered formal when the student notifies the Graduate Dean, in writing, that he/she is proceeding with such a grievance. The implications of this declaration are: a) the student will be provided with an advocate; b) all correspondence pertaining to any aspect of the grievance will be in writing and will be made available to the Graduate Dean; c) all documents relevant to the case, including minutes from all relevant meetings, will be part of the complete written record, and will be forwarded to the Graduate Dean upon receipt by any party to the grievance; d) the policy contained herein will be strictly followed; and e) any member of the academic community who does not follow the grievance policy will be subject to disciplinary actions. Filing a formal grievance is a serious matter, and the student is strongly encouraged to seek informal resolution of his/her concerns before taking such a step.

Respondent. The person who is the object of the grievance.

Procedures

Note: Grievances are confidential. Information about the grievance, including the fact that such a grievance has been filed, may never be made public to those who are not immediately involved in the resolution of the case, unless the student has authorized this release of information or has instigated a course of action which requires the respondent to respond. An exception to this confidentiality requirement is that the immediate supervisor or departmental chairperson of the respondent will be notified and will receive a copy of the resolution of the case. Since grievances against a respondent also have the potential to harm that person's reputation, students may not disclose information about the grievance, including the fact that

they have filed a grievance, to any person not immediately involved in the resolution of the case, until the matter has been finally resolved. This is not intended to preclude the student or respondent from seeking legal advice.

1. (Graduate assistants who are master's students in the Graduate School of Business should contact the Director of that School.) When a graduate student believes that his/her rights have been violated, as the result of action(s) pertaining to a graduate assistantship he/she holds or has held within the past year, the student shall first discuss his/her concerns with the respondent. If the concerns are not resolved to the student's satisfaction, the student may discuss it with the Graduate Dean and/or with the Office of Affirmative Action. If the concerns are satisfactorily resolved by any of the above discussions, the terms of the resolution shall be reduced to writing, if any of the involved parties desires to have such a written statement.

2. If the student's concerns are not resolved by the above discussions and he/she chooses to pursue the matter further, the student shall notify the Graduate Dean in writing of the nature of the complaint. This notification will include all relevant documentation and must occur within one year from the date of the occurrence.

3. Upon receipt of this notification and supporting documentation, the Graduate Dean will meet with the graduate student. If the student agrees, the Dean will notify the respondent of the student's concerns. If the student does not wish for the respondent to be notified, the matter will be dropped. The respondent will be given ten working days from receipt of the Graduate Dean's notification to respond to the concerns.

4. The Graduate Dean will meet again with the student and make an effort to resolve the concerns in a mutually satisfactory manner. If this is not possible, the Graduate Dean will refer the case to a committee.

5. Within ten working days from the final meeting between the student and the Graduate Dean, the Graduate Dean will notify the respondent and will appoint an ad hoc committee of five faculty members and two graduate students chosen to avoid bias or partiality. The Associate Dean of the Graduate School will serve as the chair of the grievance committee and will vote only in the case of a tie. A voting member of the Graduate Council will serve as the nonvoting secretary of the committee. At this time, the Graduate Dean will also assign an advocate to the student. The advocate must be a member of the graduate faculty. The immediate supervisor of the sponsor will serve as his/her advocate. Note: The student and sponsor advocates will have the responsibility to help the student/sponsor prepare his/her written materials and will attend committee meetings with the student/sponsor. The advocate will not speak on behalf of the student/sponsor and will not take part in committee discussions of the merits of the case.

6. The committee shall have access to witnesses and records, may take testimony, and may make a record by taping the hearing. Its charge is to develop all pertinent factual information (with the exception that the student and respondent will not be required to be present in any meeting together without first agreeing to do so) and, on the basis of this information, to make a recommendation to the Graduate Dean to either support or reject the grievance. The Graduate Dean will then make a decision based on the committee's recommendation and all documents submitted by the parties involved. The Graduate Dean's decision, the committee's written recommendation and a copy of all documents submitted as evidence by any party to the complaint, consistent with all privacy considerations, shall be forwarded to the person(s) alleging the grievance within 20 working days from the date the committee was first convened; copies shall be sent simultaneously to other parties involved in the grievance. A copy shall be retained by the Graduate School in such a way that the student's and respondent's privacy is protected. It should be noted that the Graduate Dean has limited authority to require a sponsor to reappoint a graduate assistant. Consequently, the redress open to the student may be limited.

7. If the grievance is not satisfactorily resolved through step 6, an appeal in writing with all relevant material may be submitted by either the student or the sponsor for consideration by the Provost/Vice Chancellor for Academic Affairs of the University of Arkansas. This appeal must be filed within 20 working days of receiving the decision of the Graduate Dean. Any appeal at this level shall be on the basis of the complete written record only and will not involve interviews with any party to the grievance. The Provost/Vice Chancellor for Academic Affairs shall make a decision on the matter within 20 working days from the date of receipt of the appeal. His/her decision shall be forwarded in writing to the Graduate Dean, the student, and the respondent. This decision is final.

8. If any party to the grievance violates this policy, he/she will be subject either to losing the assistantship position or losing the assistantship. When alleging such a violation, the aggrieved individual shall contact the Graduate Dean, in writing, with an explanation of the violation.

RESEARCH MISCONDUCT POLICIES AND PROCEDURES

(Campus Council, May 4, 1989)

The University of Arkansas, Fayetteville, will pursue allegations of research misconduct. This pursuit will involve an inquiry of the allegation; an investigation if the inquiry indicates one is warranted; and imposition of sanctions if justified.

I. Definition of Terms

Research misconduct. This term refers to: 1) fabrication, falsification, plagiarism, deception, or other practices which seriously deviate from those commonly accepted within the research community for proposing, conducting, or reporting the results of research; 2) material failure to comply with federal, state, or local requirements for protection of researchers, human subjects, the public, or laboratory animals, or other requirements which relate to the conduct of research; or 3) failure to meet other material legal requirements governing research. The term research misconduct as used in this document does include such improper activities as plagiarism of original literature and unauthorized copying of original art work.

Inquiry. The information gathering and initial fact-finding to determine whether an allegation or an apparent instance of research misconduct warrants an investigation.

Investigation. The formal examination and evaluation of all relevant facts to determine if research misconduct has occurred.

The appropriate office of research administration for the University of Arkansas, Fayetteville, is either the Office of Research and Sponsored Programs or the University of Arkansas Agricultural Experiment Station.

The date of initiation of the investigation is the day the Provost/Vice Chancellor for Academic Affairs is notified by the Chair of the Research Council that an investigation is necessary.

Note: See definition of Research Council, following this policy.

II. The Inquiry

A. An inquiry is not a formal hearing; it is designed to separate allegations deserving further investigation from frivolous, unjustified, or clearly mistaken allegations. The inquiry must result in either dismissal of the allegation or a call for an investigation. A suspected criminal act will result in the suspension of the inquiry until the appropriate law enforcement agency allows it to continue.

B. Allegations of research misconduct will be submitted to the Provost/Vice Chancellor for Academic Affairs and should be as specific and detailed as conditions permit. These allega-

tions will normally be submitted in writing and signed by the complainant(s). When the complainant(s) elect(s) not to submit a signed document, the Provost/Vice Chancellor for Academic Affairs shall exercise discretion as to whether the information presented warrants an inquiry. Whenever possible, the Vice Chancellor shall counsel confidentially with the complainant(s).

C. The Provost/Vice Chancellor for Academic Affairs will immediately charge the Chair of the Research Council with conducting an inquiry into the allegation of research misconduct. The inquiry will then be conducted by the Research Council. All members of the Research Council must disclose potential conflicts of interest to the Council, which will determine if conflicts exist and excuse member(s) from the inquiry as appropriate. In the event the Chair of the Research Council has possible conflicts of interest, the Research Council will elect a chair of the inquiry from its membership. That person will perform the same duties detailed for the Chair of the Research Council.

D. The inquiry must be initiated immediately upon receipt of an allegation of research misconduct by the Chair of the Research Council. The inquiry should be completed within 60 calendar days of the date the chair received the allegation. If circumstances clearly warrant a period of longer than 60 calendar days for the inquiry, the reasons for the extended time period shall be submitted in writing to the Provost/Vice Chancellor for Academic Affairs.

E. If criminal conduct is suspected, the appropriate authorities will be notified, and the inquiry will be suspended until those authorities notify the Research Council that it is appropriate to reconvene the inquiry.

F. A written record must be kept of the inquiry including, if necessary, the reasons for an extended inquiry period. The safety and security of the record will be assured. The Chair of the Research Council will assume responsibility for the written record and other materials acquired during the progress of the inquiry. The materials and record will be kept in the Office of Research and Sponsored Programs. Members of the Research Council wishing to view those materials and/or the written record at times other than when the Council is in session (for purposes of conducting the inquiry) must go to the Office of Research and Sponsored Programs. Only the Chair of the Research Council or those designated by the Chair may remove the record or materials and then only to bring to the Council for the purpose of conducting the inquiry.

G. During the inquiry stage, the University of Arkansas, Fayetteville, will protect the confidentiality of all parties involved to the maximum extent possible. Whether a case can be reviewed effectively without the involvement of the complainant(s) or the person(s) alleged to have committed research misconduct depends upon the nature of the allegation and the evidence available. Cases that depend specifically upon the observations or statements of the complainant(s) may not proceed without the involvement of that individual; other cases that rely on documentary evidence may permit the complainant(s) to remain anonymous. It may be necessary to include the person(s) alleged to have been involved in research misconduct during the inquiry. In such instances the person(s) must be advised of the allegation of research misconduct.

H. The complainant(s) and the person(s) alleged to have been involved in research misconduct shall supply information and material as requested by the Research Council.

I. Both the complainant(s) and the person(s) charged in the allegation may seek legal counsel. Such counsel will not be allowed to be physically present during the inquiry sessions.

J. The completion of an inquiry is marked by the Research Council's determination of whether or not an investigation is warranted and by the preparation of written documentation to summarize the process and conclusion of the inquiry. The Chair of the Research Council will provide a written report of the findings of the inquiry to the Provost/Vice Chancellor for Academic Affairs. If an investigation is needed, the Provost/Vice Chancellor for Academic Affairs will so notify in writing the complainant(s), the person(s) alleged to have been involved in research misconduct, the appropriate deans and chairs, the appropriate office of research administration, and all other persons who have been informed of the inquiry by the Research Council or University officials. If the allegations have been found to have no substance, the Provost/Vice Chancellor for Academic Affairs will immediately notify in writing only those persons informed of the inquiry and move to restore all situations to as close to their original conditions as possible.

K. If the need for an investigation is determined, any agency sponsoring the research will be immediately notified in writing by the appropriate office of research administration. The funding agency may be informed before the inquiry is complete if: 1) the seriousness of alleged misconduct is apparent; 2) immediate health hazards are involved; 3) the funding agency's resources, reputation, or other interests need protecting; 4) federal action may be needed to protect the interests of a subject of the investigation or of others potentially affected; or 5) the community or the public should be informed. If, at any point in an inquiry, criminal violations become apparent, the funding agency will be notified within 24 hours if at all possible. The appropriate legal authorities will also be notified. The funding agency will be notified if the alleged research misconduct is going to be publicly announced by the University.

L. During the inquiry, interim administrative action may be taken by the Provost/Vice Chancellor for Academic Affairs when justified by the need to protect the health and safety of research subjects, the interests of students and colleagues, or the University. Administrative action may range from slight restrictions of activities, reassignment of activities, or suspension of all research activities of the person(s) alleged to have committed research misconduct. Interim administrative action will be taken in full awareness of how it might affect the individuals and the ongoing research within the institution.

III. Rights of the Complainant(s) and Persons Alleged to have Committed Research Misconduct

A. The proceedings of an inquiry, including the identity of the person(s) alleged to have committed research misconduct, will be held in strict confidence to protect the parties involved. If confidentiality is breached and the inquiry finds the allegation to be unsupported, the Provost/Vice Chancellor for Academic Affairs will take reasonable steps to minimize the damage to reputations which may result from inaccurate reports.

B. If an allegation is found to be unsupported but has been submitted in good faith, no further formal action will be taken other than the notifications required by paragraph II.J above. Allegations that have not been brought in good faith will lead to appropriate disciplinary action. Complainants should be aware from the outset that their confidentiality will not be maintained if the Research Council determines that the complaint is maliciously motivated and false. Such complaints will be considered to be research misconduct.

C. Where a complaint has been brought in good faith even if mistaken, the University will protect the complainant(s) against retaliation. Individuals engaging in acts of retaliation will be disciplined in accordance with the policies of the University of Arkansas, Fayetteville.

IV. The Investigation

A. The investigation's purpose is to explore further the allegations and determine whether research misconduct has been committed. The investigation will focus on accusations of research misconduct as defined previously and examine the factual materials of each case. The investigation will look carefully at the substance of the charges and examine all relevant evidence.

B. Once the Research Council has determined an investigation is required, it must be conducted. The person(s) alleged to have committed research misconduct does not have the right to challenge the initiation of the investigation.

C. The Research Council will determine the composition of the investigative committee and insure that it has the appropriate expertise to evaluate the evidence. It may be possible to utilize an existing committee, the presence of which may be mandated by federal agencies. For example, the Institutional Animal Care and Use Committee may be the appropriate body to investigate an allegation of mistreatment of laboratory animals. Members of the investigative committee may come from within or outside the University of Arkansas, Fayetteville. The Provost/Vice Chancellor for Academic Affairs will provide the necessary resources for outside experts when sufficient expertise does not exist at the University of Arkansas, Fayetteville. The minimum number of committee members will be five. The Research Council will appoint the chair of the investigative committee.

D. Conflicts of interest must be avoided. Those investigating the allegations will be selected and serve with full awareness of the closeness of their professional or personal affiliation with the complainant(s) and/or the person(s) alleged to have committed research misconduct. Any person appointed to an investigative committee who may have a conflict of interest in a given case must disclose potential conflicts to the Chair of the Research Council in writing within one week. The Research Council will determine if a conflict exists and rescind or continue the appointment as appropriate.

E. The Provost/Vice Chancellor for Academic Affairs and the person(s) alleged to have committed research misconduct will be notified in writing by the Chair of the Research Council as to the composition of the investigative committee.

F. The person(s) alleged to have committed research misconduct shall have an opportunity to respond to the allegation. Any initial response to the allegation should be received in writing by the Chair of the Research Council within 15 calendar days following the date of the notification letter described in IV.E. The Chair of the Research Council shall immediately forward any response to the chair of the investigative committee.

G. The investigation will be conducted as expeditiously as possible. In most cases the investigation will be completed within 120 calendar days of its initiation. In certain cases 120 days may be insufficient. In such cases the investigative committee will prepare an interim written report by the 120th calendar day after the initiation of the investigation to report progress to date, including reasons for the extra time required for the completion of the investigation. The chair of the investigative committee will distribute the report to the Provost/Vice Chancellor for Academic Affairs, the person(s) alleged to have committed research misconduct, the appropriate office of research administration, and the Chair of the Research Council.

H. Written records and all other materials pertinent to the investigation will be kept in the Office of Research and Sponsored Programs and will be available only to individual investigative committee members. Only the chair of the investigative committee or his/her designee may remove the records and material.

I. In the course of an investigation, additional information may emerge which justifies broadening the scope of the investigation beyond the initial allegations. Any such change in scope will be immediately reported in writing by the chair of the investigative committee to the Chair of the Research Council, who will notify the Provost/Vice Chancellor for Academic Affairs, the complainant(s), the person(s) alleged to have committed research misconduct, and the appropriate office of research administration. The appropriate office of research administration will report significant new developments during the investigation to any sponsor(s) of the research as they occur.

J. The person(s) alleged to have committed research misconduct must provide information requested by the investigative committee. All involved parties are obligated to cooperate with the investigative committee in providing information relating to the case.

K. Throughout the investigation, the person(s) alleged to have committed research misconduct may, at the discretion of the investigative committee, be advised of the progress of the investigation and afforded the opportunity to respond and/or provide additional information to the investigative committee.

L. The person(s) alleged to have committed research misconduct will be allowed to submit written statements from others, to appear before the investigative committee and make an oral statement, and to answer questions. In any appearance before the investigative committee, the person(s) alleged to have committed research misconduct may be accompanied by one person, who may be an attorney, to advise him/her. The adviser shall not address the investigative committee, speak on behalf of the person, or otherwise participate actively in the investigation. The person(s) alleged to have committed research misconduct may not be present during testimony of other witnesses or during committee deliberations, nor may he/she have access to committee records.

M. In the event criminal actions are discovered during the investigation, the proper authorities will be notified and the investigation will be suspended until those notified authorities approve its resumption.

N. During the investigation, interim administrative action may be taken by the Provost/Vice Chancellor for Academic Affairs when justified by the need to protect the health and safety of research subjects, the interests of students and colleagues, or the University. Administrative action may range from slight restrictions of activities, reassignment of activities, or suspension of all research activities of the person(s) alleged to have committed research misconduct. Interim administrative action will be taken in full awareness of how it might affect the individuals and the ongoing research within the institution.

O. The investigation into allegations of research misconduct may have any number of outcomes, including but not limited to a determination that:

1. no research misconduct or serious research error was committed;
2. no research misconduct was committed, but serious research errors were discovered in the course of the investigation; or
3. research misconduct was committed.

P. The investigative committee will provide a draft report to the Chair of the Research Council, who will provide copies to the person(s) alleged to have committed research misconduct, the complainant(s), and the Provost/Vice Chancellor for Academic Affairs for their comment prior to preparation of the final written report. This report will contain the tentative findings of the investigative committee with its rationale. The investigative

committee will allow at least 15 calendar days from the date the report is mailed to the Chair of the Research Council for input from any of the parties receiving the draft report before preparing the final report. Copies of the final report will be distributed by the Chair of the Research Council to the person(s) alleged to have committed research misconduct, the complainant(s), the Provost/Vice Chancellor for Academic Affairs, and the appropriate office of research administration.

V. Procedures Once the Investigation is Complete

A. The Research Council will conduct a substantive review of the findings and rationale of the investigative committee within 15 calendar days from the date of the final report of the committee. The Research Council may accept or modify the findings of the investigative committee and shall recommend corrective or disciplinary action, if appropriate. The Chair of the Research Council will report in writing the action of the Research Council to the Provost/Vice Chancellor for Academic Affairs, the chair of the investigative committee, the complainant(s), those alleged to have committed research misconduct, the appropriate office for research administration, and others notified of the investigation.

B. No Finding of Research Misconduct: When the investigation finds no support for allegations of research misconduct and the Research Council concurs, the University of Arkansas, Fayetteville, will retain the findings of the investigation in a confidential and secure file in the Office of Research and Sponsored Programs. The Chair of the Research Council will notify in writing all persons informed of the investigation that the allegation lacked substance. The Provost/Vice Chancellor for Academic Affairs will take reasonable steps to repair the reputations of those alleged to have committed research misconduct. If the allegations of research misconduct are found to be maliciously motivated, appropriate disciplinary actions will be taken against those responsible. If the allegations, however incorrect, are found to have been made in good faith, no disciplinary measures will be taken against the complainant(s), and efforts will be made to prevent retaliatory actions. The Provost/Vice Chancellor for Academic Affairs will be responsible for these efforts.

C. Serious Research Error is Found: When serious research error has been found, the University of Arkansas, Fayetteville, will consider means of correcting the research record. When appropriate, this will involve written notification by the Chair of the Research Council to the editors of appropriate journals or other documents in which the errors were reported.

Sanctions may be imposed on those found to have committed serious research error. The Chair of the Research Council will notify all persons informed of the investigation that serious research error has occurred.

D. Finding of Research Misconduct: Sanctions will be imposed on those found to have committed research misconduct.

VI. Sanctions

A. The Provost/Vice Chancellor for Academic Affairs will review the corrective or disciplinary action recommended by the Research Council. The Provost/Vice Chancellor may implement the action as recommended or modify it as appropriate.

B. Institutional disciplinary actions include but are not limited to:

1. special monitoring of future work,
2. letter of reprimand,
3. removal from a particular project,
4. probation,
5. suspension,
6. salary reduction,
7. rank reduction, and
8. termination of employment.

C. The Provost/Vice Chancellor for Academic Affairs will report in writing the sanctions imposed to the person(s) found to have committed serious research error or misconduct, the complainant(s), the Chair of the Research Council, the appropriate deans and chairs, and the appropriate office of research administration which will notify the research sponsor(s).

VII. Brief Final Report

The Chair of the Research Council will prepare a brief final report which summarizes the findings of the investigative committee, the action of the Research Council, the sanctions imposed by the Provost/Vice Chancellor for Academic Affairs, and any additional related actions by the involved parties. When no finding of serious research error or misconduct is found, the Chair of the Research Council will distribute the final report only to those informed of the investigation. When serious error or misconduct has been found, the Chair of the Research Council will distribute the final report to those informed of the investigation and to appropriate individuals and agencies in the following list. The list is illustrative but not exhaustive of those who should receive the brief final report:

1. sponsoring agencies, funding sources;
2. co-authors, co-investigators, collaborators;
3. editors of journals in which inappropriate research was published;
4. state professional licensing boards;
5. editors of journals or other publications, other institutions, sponsoring agencies, and funding sources with which the individual has been affiliated;
6. professional societies;
7. legal authorities if appropriate; and
8. the person(s) who committed the research error or misconduct.

The original copy of the final report will be stored in the Office of Research and Sponsored Programs with the other documents pertaining to the investigation.

VIII. Public Disclosure

The Provost/Vice Chancellor for Academic Affairs will issue a press release following a finding that serious research error or misconduct has occurred and sanctions imposed.

IX. Outside Investigations

The University of Arkansas, Fayetteville, recognizes that sponsoring agencies may conduct their own inquiries and investigations and impose their own sanctions.

THE RESEARCH COUNCIL

The Research Council recommends policies to encourage research, establish a research environment, and provide research support facilities; serves as a review board for proposed research programs and facilities; recommends adjudication of variances to policies and procedures; supervises the approved policies; and addresses research misconduct cases at the direction of the Provost/Vice Chancellor for Academic Affairs. Membership consists of a faculty member active in research from: a) the Dale Bumpers College of Agricultural, Food and Life Sciences; b) the Sam M. Walton College of Business; c) the College of Education and Health Professions; d) the College of Engineering; and e) one from the science areas of the J. William Fulbright College of Arts and Sciences and f) one from another research area in the Fulbright College; g) non-voting, one student; h) ex officio and non-voting, the Director of Research and Sponsored Programs; and i) ex officio and non-voting, the Vice Provost for Research. A secretary (non-voting) will be provided by the Office of Research and Sponsored Programs.

POLICIES/PROCEDURES FOR USE OF TOXIC SUBSTANCES ON CAMPUS

The University of Arkansas is committed to the health and safety of its students, faculty, and staff. It is recognized that during their work for the University, some people will be involved in activities that require the use of substances or materials that are hazardous or toxic in nature. The Environmental Health and Safety unit of the physical plant has prepared the UAF Chemical Hygiene plan. This document addresses the safe use of toxic substances in laboratories. In addition, it defines the minimum acceptable standard safety practices for execution of laboratory work for both research and teaching. The chemical hygiene plan is available from the Office of Environmental Health and Safety at http://www.phpl.uark.edu/ehs/ and is the full statement of the UAF campus policy and procedures for handling toxic substances.

TRAVEL POLICY FOR GRADUATE STUDENTS

Graduate students who travel on University business must comply with the travel policies of the University. For those graduate students not on assistantships/fellowships, please see the University policy at http://studentaffairs.uark.edu/ by clicking on "Student Travel Policy."

TERM PAPER ASSISTANCE

The use of the services of term paper assistance companies is a violation of University policies on academic integrity. Student submission of such research or term papers to meet requirements of any class or degree program is expressly prohibited and constitutes academic dishonesty. Any violation of this prohibition will automatically result in both punitive action by the instructor (e.g., the award of a grade of "F" for the course) and a referral of each violation to the All-University Judiciary Committee for its consideration.

ACADEMIC DISMISSAL/ACADEMIC PROBATION

Students may be dropped from further study in the Graduate School if at any time their performance is considered unsatisfactory as determined by either the program faculty or the Dean of the Graduate School. Academic or research dishonesty and failure to maintain a specified cumulative grade-point average are considered to be unsatisfactory performance. See the Graduate Student Dismissal Policy, the Academic Probation Policy for Graduate Students, the Academic Honesty Policy for Graduate Students, and the Research Misconduct Policy, in this catalog.

Using its own written procedures, the graduate faculty of an academic degree program may recommend that the student be readmitted to the Graduate School after dismissal. Dismissed students with non-degree status may petition for readmission to the Graduate School by submitting a written appeal to the Dean of the Graduate School. The graduate faculty of any degree program may establish and state in writing requirements for continuation in that program.

GRADUATE STUDENT DISMISSAL POLICY

Graduate degree programs have the right to dismiss graduate students who a) do not make adequate academic progress; b) engage in academic or research misconduct; or c) engage in illegal, fraudulent, or unethical behavior as defined in any of the University codes or policies pertaining to academic and research honesty. There may also be other unusual situations in which a student may be dismissed from a degree program. In each case, the dismissal should comply with the following procedures.

Lack of Adequate Academic Progress

Students may be dismissed per the academic probation policy of the Graduate School, and students should familiarize themselves with this policy. In addition, students who have not been placed on probation, but who are not making adequate academic progress, may also be dismissed. They must be warned in writing of the possibility of dismissal and will be given a clear statement about what must be done within a specified time period to alleviate the problem. A copy of this warning letter must be filed with the Graduate School. These expectations must be reasonable and consistent with expectations held for all students in the program. If the student does not meet the requirements within the time frame specified, he/she may be dismissed by the degree program with notification to the student and the Graduate School. Students dismissed in this way will not necessarily be dismissed by the Graduate School. Students may appeal this dismissal to the Graduate School, following the procedures outlined in the Graduate Student Grievance Policy.

Academic or Research Misconduct/Illegal, Fraudulent, or Unethical Behavior

For the process for dismissing students as a result of academic or research misconduct; or as a result of illegal, fraudulent, or unethical behavior, please see the "Academic Honesty Policy for Graduate Students," the "Research Misconduct Policy," and the *University of Arkansas Student Handbook*. Students who are dismissed by their degree programs for academic or research misconduct after the appropriate due process review will also be dismissed by the Graduate School.

Other Situations

Departments may dismiss students for situations other than those specified above. When doing so, the department must notify the student in writing of the possibility of dismissal and send a copy of this letter to the Graduate School. If it is possible for the student to rectify the situation, he/she must be given a clear statement about what must be done within a specified time period to alleviate the problem. These expectations must be reasonable and consistent with expectations held for all students in the program. If the student does not meet the requirements within the time frame specified, he/she may be dismissed by the degree program with notification to the student and the Graduate School. Students dismissed in this way will not necessarily be dismissed by the Graduate School.

If the situation cannot be rectified, the student will be notified in writing of the grounds for dismissal and the date when the dismissal will be effective. This will normally be the end of the semester in which the student is enrolled, but the circumstances of the dismissal will be important in determining this date.

Students may appeal their dismissal to the Graduate School, following the procedures outlined in the Graduate Student Grievance Policy.

ACADEMIC PROBATION POLICY FOR GRADUATE STUDENTS

Whenever a regularly admitted graduate student earns a cumulative grade-point average below 2.85 on graded course work taken in residence for graduate credit, he/she will be warned of the possibility of academic dismissal. When a graduate student has accumulated a minimum of 15 hours of graded course work taken in residence for graduate credit with a cumulative grade-point average below 2.85, and has received at least one warning, he/she will be academically dismissed from the Graduate School. This policy is effective with students entering the Graduate School in Fall 2002 or after. For the policy in effect before that time, contact the Graduate School. If a

student is originally admitted prior to Fall 2002, but does not maintain registration and applies for readmission after Fall 2002, the current policy will apply.

Graduate teaching and research assistants and students on Lever, Doctoral, Chancellor, Walton or other fellowships must maintain a cumulative grade-point average of at least 2.85 on all course work taken for graduate credit. If a student's cumulative GPA falls below 2.85 on 6 or more hours of graduate work (one full-time semester), notification will be sent to the student and his/her department. If the CGPA is below 2.85 at the end of the next major semester (fall or spring), the department will not be allowed to appoint the student to an assistantship/fellowship until such time as his/her CGPA has been raised to the required level. Note: Individual degree programs may have more stringent requirements.

The Graduate School calculates the cumulative grade-point average on all courses taken for graduate credit at the University of Arkansas. Individual degree programs have the option to calculate the cumulative grade-point average only for those graduate courses taken in residence for the current degree. Consequently, individual degree programs may academically dismiss students whose cumulative grade point average on all graduate course work is above 2.85, but whose work for the current degree is below 2.85. If a program adopts this alternative policy, it must be so stated in the departmental graduate student handbook and in the Graduate Catalog and must apply to all graduate students in that program. When the program anticipates dismissing a student whose cumulative grade-point average is above 2.85, the program must notify the student, using the same process as specified in the general probation policy and must also notify the Graduate School. This policy is effective Fall 2003.

ACADEMIC HONESTY POLICY FOR GRADUATE STUDENTS

Scope, Implementation, and Review

The procedures contained in this policy pertain to graduate students under the authority of the Graduate School. Master's students in the Graduate School of Business should contact their dean's office for policies pertaining to them. Law students should contact the School of Law. Undergraduate students should refer to the *Student Handbook*. Where policies contained herein conflict with those described for undergraduate students in the *Student Handbook*, the policies contained in this policy shall take precedence for graduate students.

For details of procedures for implementing this policy, contact the Office of Community Standards and Student Ethics or the Graduate School. This University policy does not preclude the implementation by colleges or schools of more rigorous policies.

Academic Honesty

The University of Arkansas presents this policy as part of its effort to maintain the integrity of its academic processes. Academic honesty should be a concern of the entire University community, and a commitment to it must involve students, faculty, staff, and administrators.

Students must understand what academic integrity is and what the most common violations are. With that understanding, they must commit themselves to the highest standards for their own, as well as for their peers', academic behavior.

Public support and encouragement by the faculty is a second critical component necessary to strengthen academic integrity on campus. Faculty members must be continually vigilant in the management of their classes, their assignments, and their tests.

Finally, the administration of the University must present to the students standards of academic integrity. Those standards must be part of a publicly recognized, understood, and accepted set of policies and procedures that can be applied consistently and fairly in cases of academic dishonesty.

It is the responsibility of each student, faculty member, and administrator to understand these policies. A lack of understanding is not an adequate defense against a charge of academic dishonesty.

With regard to the application of this policy, the University assures its support of faculty members and other employees of the University who are acting in good faith in the course and scope of their employment and in the performance of their official duties.

This policy is only a part of the University's effort to promote academic and research integrity in all aspects of its programs. By necessity, this policy discusses only prohibited acts and a process of applying sanctions. The ultimate goal, of course, is to provide an atmosphere that will make superfluous the procedures and sanctions that follow.

Definition of Terms

Academic dishonesty. Academic dishonesty involves acts that may subvert or compromise the integrity of the educational or research process at the University of Arkansas. Included is an act by which a student gains or attempts to gain an academic advantage for himself/herself or another by misrepresenting his/her or another's work or by interfering with the completion, submission, or evaluation of work. Academic misconduct may include those acts defined as research or scholarly misconduct. Allegations of research or scholarly misconduct on the part of graduate students are subject to this policy. However, such cases may also be reviewed under the University's Research Misconduct Policies and Procedures.

Academic/Research Misconduct. Academic and/or research misconduct may include, but is not limited to, accomplishing or attempting any of the following acts:

- Altering grades or official records.
- Using any materials that are not authorized by the instructor for use during an examination.
- Copying from or viewing another student's work during an examination.
- Collaborating during an examination with any other person by giving or receiving information without specific permission of the instructor.
- Stealing, buying, or otherwise obtaining information about an examination not yet administered.
- Collaborating on laboratory work, take-home examinations, homework, or other assigned work when instructed to work independently.
- Substituting for another person or permitting any other person to substitute for oneself to take an examination.
- Submitting as one's own any theme, report, term paper, essay, computer program, other written work, speech, painting, drawing, sculpture, or other art work prepared totally or in part by another.
- Submitting, without specific permission of the instructor, work that has been previously offered for credit in another course.
- Plagiarizing, that is, the offering as one's own work, the words, ideas, or arguments of another person or using the work of another without appropriate attribution by quotation, reference, or footnote. Plagiarism occurs both when the words of another (in print, electronic, or any other medium) are reproduced without acknowledgement and when the ideas or arguments of another are paraphrased in such a way as to lead the reader to believe that they originated with the writer. It is not sufficient to provide a citation if the words of another have been reproduced – this also requires quotation marks. It is the responsibility of all University students to understand the methods of proper attribution and to apply those principles in all materials submitted.
- Sabotaging of another student's work.

- Falsifying or committing forgery on any University form or document.
- Submitting altered or falsified data as experimental data from laboratory projects, survey research, or other field research.
- Committing any willful act of dishonesty that interferes with the operation of the academic or research process.
- Facilitating or aiding in any act of academic or research dishonesty.

Procedures

Sanctions for acts of academic dishonesty committed by graduate students may be applied in the following ways.

A. Initial Report of Infraction

1. Infractions Involving Graded Course Work

When an instructor determines or believes that a student in the instructor's class is responsible for academic dishonesty deserving of sanction, the instructor will meet with the student and explain the allegation. Without waiving the option to pursue charges, the instructor may also choose to contact the Office of Student Mediation and Conflict Resolution for help in resolving the situation. If the instructor wishes to pursue charges of academic misconduct, he/she should within five working days after meeting with the student, or as soon as practicable thereafter, follow a. or b. (following). If the Office of Student Mediation and Conflict Resolution is involved, the five days does not begin until the instructor is aware of the termination of those services. (If the instructor is either a graduate teaching assistant or a temporary faculty member, then a supervising faculty member or the departmental head or chairperson may assist in the handling of an academic dishonesty case.)

a. The instructor may determine a grade sanction and within five working days report that sanction along with the essential details of the matter to the judicial coordinator in the Office of Community Standards and Student Ethics and to the Graduate Dean. The student sanctioned in this way by an instructor will be notified by the Office of Community Standards and Student Ethics and will have five working days from that notification to request a hearing by the All University Judiciary (AUJ). The All University Judiciary is defined, and its composition described, in the *Student Handbook*. If the student does not request a hearing within five working days, then it is assumed that the sanction is not contested. The student will be required to have a conference with the judicial coordinator so that the consequences of the action can be made clear. The student may appeal a grade sanction to the AUJ only on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate Students.

To the extent practical, at the discretion of the instructor, during the course of an appeal to the AUJ or the Graduate Grievance committee (depending on the nature of the appeal), the student's participation in the affected class should continue so that any action can be reversed without prejudicing the student's academic performance and evaluation.

The AUJ is given the authority to determine whether the evidence substantiates the charges of the instructor. If the AUJ determines that the evidence does not substantiate the charges, the grade sanction will be withdrawn and the matter will end. Should the AUJ determine the evidence does substantiate the charges of the instructor, the grade sanction will stand, and the AUJ may also impose additional sanctions, as listed under Sanctions, below. The degree program and/or the Graduate School may impose sanctions in addition to those imposed by the instructor and the AUJ, including expulsion from the program or the University. While the instructor should be consulted in such cases, these additional sanctions may be imposed by the AUJ, the Graduate School and/or the degree program without the permission of the instructor. In addition to other sanctions, graduate students may be dismissed by their degree program or the Graduate School on the first or any subsequent instances of academic dishonesty. Students may not withdraw from either courses in which judicial action is pending or in which they have received a grade sanction.

b. The instructor may file an incident report form referring the case to the student judicial process for determinations of responsibility and the application of sanctions. If the student is determined to be responsible for academic dishonesty, then the instructor may apply a grade sanction in addition to whatever sanctions are applied by the judicial process. To the extent practical, at the discretion of the instructor, while such a case is pending in the judicial process, the student's participation in the affected class should continue, to avoid pre-empting the options available after responsibility is determined.

If the student is determined to be responsible for the actions charged, the instructor will impose a grade sanction. The AUJ has no authority to impose a grade sanction but is permitted to make a recommendation and to impose other sanctions, as described below. Additionally, the Graduate School and/or the degree program may impose sanctions in addition to those imposed by the instructor. In such cases, the instructor should be consulted, but additional sanctions may be imposed by the AUJ, the Graduate School, and/or the degree program without the permission of the instructor. Students may not withdraw from a course for which judicial action is pending or in which they have received a grade sanction. Should the graduate student feel that the severity of the grade sanction is unfair, he/she may appeal via the Academic Grievance Policy for Graduate Students.

It should be noted that, in addition to other possible sanctions, graduate students may be dismissed by their degree program and/or the Graduate School on the first or any subsequent instance of academic dishonesty.

2. Infractions Not Involving Graded Course Work

Cases of academic misconduct may occur in situations not involving graded course work. One example is a situation where a graduate student plagiarizes material for his/her dissertation. In cases not involving graded course work, the department chairperson/program director and major professor, or other appropriate official(s) will meet with the student. Without waiving the option to pursue charges, the program may also choose to contact the Office of Student Mediation and Conflict Resolution for help in resolving the situation. If the department/program decides to proceed with charges of academic misconduct, the chair/head/director or other appropriate official will, within five working days after meeting with the student, or as soon as practicable thereafter, follow one of the following: (If the Office of Student Mediation and Conflict Resolution is involved, the five days does not begin until the instructor is aware of the termination of those services.)

a. The department or program faculty will determine a sanction, and the department chairperson/program director will, within five working days after meeting with the student (or as soon as practicable thereafter), report that sanction along with the essential details of the incident to the judicial coordinator in the Office of Community Standards and Student Ethics and

to the Graduate Dean. The student sanctioned in this way by a department or program will be notified by the Office of Community Standards and Student Ethics and will have five working days from that notification to request a hearing by the All University Judiciary (AUJ). The All University Judiciary is defined, and its composition described, in the *Student Handbook*. If the student does not request a hearing within five working days, then it is assumed that the sanction is not contested. The student will be required to have a conference with the judicial coordinator so that the consequences of the action can be made clear.

The student may appeal such a sanction to the AUJ only on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate Students.

While such a case is pending in the student judicial process, to the extent practical, at the discretion of the program, the student's participation in the degree program should continue so that any action can be reversed without prejudicing the student's academic performance and evaluation.

b. The department chairperson/program director may file an incident report form referring the case to the judicial process for determination of responsibility. If the student is determined to be responsible for academic dishonesty, then the judicial board may impose a sanction in addition to that imposed by the program/department and the Graduate School. Sanctions are listed and described below. To the extent practical, at the discretion of the program, while such a case is pending in the judicial process, the student's participation in the program should continue, to avoid pre-empting the options available after the responsibility is determined.

Unlike the situation in which the Judicial Board hears the appeal of a student protesting a sanction imposed by the department/program, students who are sanctioned by the Judicial Board itself may appeal both the imposition of and the severity of the sanction via the Academic Grievance Procedure for Graduate Students. Graduate students may be dismissed by their degree program and/or the Graduate School on the first or any subsequent instance of academic dishonesty.

B. Appeals

1. When a sanction has been imposed by the instructor or department/program: The student may appeal such a sanction to the AUJ on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate Students. In both cases, the student will notify the appropriate office of his/her appeal within five working days of receiving the sanction, or as soon as practicable. For appeals to the AUJ, the student will contact the Office of Student Ethics and Community Standards. For appeals following the Academic Grievance Procedures for Graduate Students, the student will contact the Graduate School.

2. When a sanction has been imposed by the AUJ: Unlike the situation in which the Judicial Board hears the appeal of a student protesting a sanction imposed by the department/program, students who are sanctioned by the Judicial Board itself may appeal either or both the imposition of and the severity of the sanction via the Academic Grievance Procedure for Graduate Students. Students who wish to initiate such an appeal shall contact the Graduate School within five working days of receiving the sanction, or as soon as practicable.

3. When a sanction has been imposed by the Graduate School: Students who are sanctioned by the Graduate School may appeal to the Provost/Vice Chancellor for Academic Affairs.

Sanctions

The choice of sanctions in cases of academic dishonesty involves considerations of the integrity of the educational process of the University. There is no place in that process for academic dishonesty, and these actions will be taken seriously. The intent of this policy is to make acts of academic dishonesty clear risks; that is, the sanctions are to be sufficiently heavy to deter academic dishonesty.

While not intended to be an exhaustive list, the following are possible sanctions for academic dishonesty:

- Grade Sanctions: An instructor may impose a grade sanction. Grade sanctions may consist of either grades of zero or failing grades on part or all of a submitted assignment or examination, or a lowering of a course grade, or a failing course grade. All grade sanctions must be appropriately reported as outlined in the procedures above. A graduate student may appeal the severity of a grade sanction via the Academic Grievance Procedures for Graduate Students. Once a grade sanction has been applied, following the procedures outlined herein, students may not withdraw from courses in which they have been assessed a grade sanction, unless this has been recommended by the AUJ or a grievance committee.
- Other Sanctions: The graduate student's program or the Graduate School may impose a variety of other sanctions, including but not limited to any of the following: requiring an activity designed to increase the student's awareness of and understanding about academic honesty, placing the student on probation or suspension, or dismissing the student.
- The AUJ may administer the following sanctions: University reprimand, University censure, conduct probation, restrictive conduct probation, suspension, indefinite suspension, educational sanctions, or expulsion. Please see the *Student Handbook* for definitions of these sanctions.

It should be noted that graduate students may receive any of these sanctions, including dismissal, upon the first or any subsequent finding of academic misconduct.

ANNUAL NOTICE OF STUDENT RIGHTS UNDER THE FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are as follows:

1. The right to inspect and review the student's education records, with some exceptions under the Act, within 45 days of the day the University receives a request for access. Students should submit to the Registrar's Office written requests that identify the record(s) they wish to inspect. The appendix to Universitywide Administrative Memorandum 515.1 provides a list of the types and locations of education records, the custodian of those records, and copying fees for each individual campus. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate or misleading. Students should write the University official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. A sample form, which may be used in making this request, is contained in the appendix to

Universitywide Administrative Memorandum 515.1.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing and is also contained in the Universitywide Administrative Memorandum 515.1

3. The right to withhold consent of disclosure of directory information, which information: the student's name; address; telephone number; date and place of birth; nationality; religious preference; major field of study; classification by year; number of hours in which enrolled and number completed; parents' or spouse's names and addresses; marital status; participation in officially recognized activities and sports; weight and height of members of athletic teams; dates of attendance including matriculation and withdrawal dates; degrees, scholarships, honors, and awards received, including type and date granted; most recent previous education agency or institution attended; and photograph.

This information will be subject to public disclosure unless the student informs the Registrar's Office in writing each semester that he or she does not want his information designated as directory information. To prevent publication of name in the printed student directory, written notice must reach the Registrar's Office by August 31 of the Fall semester

4. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an educational record to fulfill his or her professional responsibility.

Upon request, the University also discloses education records without consent to officials for another school in which a student seeks or intends to enroll.

5. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is as follows:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-4605

6. Universitywide Administrative Memorandum 515.1 is available on request in Mullins Library on campus.

ANNUAL GRADUATE STUDENT ACADEMIC REVIEW

It will be a policy of the Graduate Council that every master's, specialist, and doctoral student will be reviewed annually by his/her degree program for progress toward the degree. At a minimum, the review will cover progress in the following: a) completing courses with an adequate grade-point average; b) completing the thesis/dissertation/project requirements; c) completing all of the required examinations; d) completing other requirements for the degree. When the review of each student is completed, the review form will be signed by the graduate student and the department/program head/chair, as well as other appropriate individuals as designated in the program review policy. This review will be forwarded to the Graduate School, to be included in the student's file.

GRADUATE SCHOOL REGISTRATION AND LEAVE OF ABSENCE POLICY

All doctoral students who have been admitted to candidacy must enroll in a minimum of one hour of dissertation credit every semester (fall, spring, summer) until they graduate. Under unusual circumstances, this enrollment requirement may be waived for post-candidacy doctoral students for up to two years, with an approved request for a leave of absence. To request a leave of absence, the student's major professor must petition the Graduate Dean, specifying the circumstances that make it necessary for the student to interrupt his/her studies. While a decision will be made on a case-by-case basis, circumstances that might be considered include serious illness of the student or his/her immediate family, serious personal problems, or job-related issues. While the student is on an approved leave of absence, he/she cannot use any University resources, such as e-mail, the library, or faculty time. A post-candidacy doctoral student who takes an unauthorized break in registration by failing to maintain continuous enrollment or failing to obtain a leave of absence will no longer be considered a graduate student at the University of Arkansas. Students who wish to be reinstated will be required to file an Application for Readmission (no fee) and register for three graduate credits for each term of unauthorized break in registration. In the case of extraordinarily extenuating circumstances, students may appeal the provisions of this policy and request additional terms of leave of absence or forgiveness of the additional credits of registration. Such an appeal must be made to the Graduate Dean.

The student should be aware that the leave of absence policy does not waive the time requirements for a degree. A separate petition must be made for a time extension, if required.

TIME EXTENSION

It is a requirement of the Graduate School that master's and specialist students complete their degrees within six consecutive calendar years from the first semester of enrollment in the program and doctoral students complete the degree within seven consecutive calendar years from the Declaration of Intent. Requests to extend these time requirements must be reviewed and approved by the Graduate Dean, following these procedures:

1. The student's major adviser will fill out a "Request for Time Extension" form (available on the web-site of the Graduate School) and submit this to the Graduate School.
2. For both master's and doctoral students, the central consideration in determining whether more time can be allowed is whether the student's knowledge of the subject matter is current at the time of graduation. Therefore, as part of the request for time extension, the major adviser will be asked to explain how this will be ensured:
   - For the master's degree, the student's knowledge of any course work over six years old at the time of graduation must be recertified. Please see "Recertification of Student's Knowledge of Course Content," below.
   - For the doctoral degree, recertification of the student's knowledge of course work is not necessary, but the major adviser must explain how the currency of the student's knowledge of the field will be assessed prior to graduation.

Recertification of Student's Knowledge of Course Content: The major adviser must specify how recertification of the student's knowledge of course content will occur. By recertification, we mean that the student's knowledge of the subject matter included in the course is determined to be current at the time of graduation. There are several ways this may be demonstrated. Examples include: The student is teaching the subject matter in a separate context; the student will be examined by the current instructor of the course to determine his/her currency of knowledge; the student will be examined on the subject matter during his/her final oral defense of the thesis or during the comprehensive exam. It is not acceptable to say that the content of the course has not changed in the time since the student was enrolled, as it is the student's knowledge that is most critical. The course content does not speak to this issue.

ADMINISTRATIVE REQUIREMENT FOR GRADUATION

Application for graduation must be completed in the Graduate Dean's office, filed with the Registrar and fees paid for the semester in which degree requirements will be completed and graduation effected. If a student fails to complete the degree, the student must then renew the application and pay a renewal fee.

DEGREES OFFERED

The faculty of the Graduate School, under the authorization of the Board of Trustees, grants the degrees listed below. In addition, the faculty of the Graduate School offers several non-degree graduate certificates. The graduate faculty, as represented by the Dean of the Graduate School and through the Graduate Council, has primary responsibility for the development, operating policies, administration, and quality of these programs. Operating through the Graduate Dean, the faculty appoints committees that directly supervise the student's program of study and committees that monitor research activities and approve theses and dissertations.

Doctor of Philosophy
Doctor of Education
Educational Specialist
Master of Accountancy
Master of Arts
Master of Arts in Teaching
Master of Business Administration
Master of Education
Master of Fine Arts
Master of Information Systems
Master of Music
Master of Public Administration
Master of Public Service (Clinton School)
Master of Science
Master of Science in Biological Engineering
Master of Science in Biomedical Engineering
Master of Science in Chemical Engineering
Master of Science in Civil Engineering
Master of Science in Computer Engineering
Master of Science in Electrical Engineering
Master of Science in Engineering
Master of Science in Environmental Engineering
Master of Science in Industrial Engineering
Master of Science in Mechanical Engineering
Master of Science in Nursing
Master of Science in Operations Management
Master of Science in Operations Research
Master of Science in Telecommunications Engineering
Master of Science in Transportation Engineering
Master of Social Work
Master of Transportation and Logistics Management

GRADUATE CERTIFICATES (NON-DEGREE)

As defined by the Arkansas Department of Higher Education, graduate certificate programs consist of 12 to 18 hours of required course work in a focused area of study. The awarding of the certificate will be shown on the student's transcript. Students must meet the admission requirements of the Graduate School and the certificate program. Students who enter a graduate certificate program may use up to six hours of course work taken previously at the University of Arkansas to meet certificate requirements, with approval of the program faculty. Students who enter a graduate certificate program must complete all certificate requirements within six years of admission to the program. For students who have been admitted to both a degree program and a certificate program, courses taken to meet the requirements of one may also be used to meet the requirements of the other, at the discretion of the program and the student's Advisory Committee. Graduate Certificates are offered in the following areas:

Advanced Instrumental Performance (Music)
Education Policy Studies (Educational Leadership, Counseling and Foundations)
Educational Measurement (Educational Leadership, Counseling and Foundations)
Educational Program Evaluation (Educational Leadership, Counseling and Foundations)
Educational Statistics and Research Methods (Educational Leadership, Counseling and Foundations)
Gerontology (Interdisciplinary)

MASTER'S DEGREES

The degree of Master of Arts (M.A.) is conferred for graduate work of which the major portion has been done in the liberal arts.

The degree of Master of Science (M.S.) is conferred for graduate work of which the major portion has been done in agriculture, educational foundations, engineering, kinesiology, health science, counseling, rehabilitation, human environmental sciences, biological and physical sciences, statistics, operations management, and communication disorders.

The degree of Master of Accountancy (M.Acc.) is conferred upon a student who completes an approved program of graduate studies in accounting.

The degree of Master of Arts in Teaching (M.A.T.) is conferred upon a student who majors in agricultural education, childhood education, middle-level education, physical education, secondary education, or vocational education.

The degree of Master of Business Administration (M.B.A.) is conferred upon a student whose major work is in the field of business.

The degree of Master of Education (M.Ed.) is conferred upon a student who majors in the field of education.

The degree of Master of Information Systems (M.I.S.) is conferred upon a student who completes an approved program in information systems.

The degree of Master of Music (M.M.) is conferred upon a student who completes an approved program of graduate studies in music.

The Master of Public Administration (M.P.A.) is conferred upon a student who completes an approved program of graduate studies in the field of public administration.

The degree of Master of Fine Arts (M.F.A.) in art, creative writing, drama, or translation is conferred upon a student who completes an approved program of graduate studies in these areas.

The Master of Science in Nursing is conferred upon a student who completes an approved program of graduate studies in this area.

The degree of Master of Social Work is conferred upon a student who completes an approved program of graduate studies in this area.

The degree of Master of Transportation and Logistics Management (M.T.L.M.) is conferred upon a student who completes an approved program of graduate studies in this area.

MASTER OF ARTS, MASTER OF SCIENCE

General minimum requirements of the Graduate School follow for the degrees of Master of Arts, Master of Science, including the several engineering degrees. Note: For degree requirements in the Master of Arts in Economics, see the Graduate School of Business.

1. 24 graduate semester hours and a thesis, or 30 semester hours without a thesis. (The thesis may be a departmental requirement or may be required by the major adviser.)
2. A comprehensive examination.
3. A cumulative grade-point average of 2.85. (Individual departments may have higher grade standards.)
4. Minimum residence of 24 weeks. (See Residence Requirements.)

Departments may set higher grade standards and other requirements.

Program of Study. At the time of admission to the Graduate School and acceptance in a program of study leading to a graduate degree, the student is assigned to a major adviser. The choice of a major adviser is largely determined by the student's choice of a major subject.

The program of study may consist of courses chosen from one department or it may include such cognate courses from other departments as may in individual instances seem to offer greatest immediate and permanent values. As a general principle, two-thirds of the courses come from the degree program in which the student is seeking a graduate degree. The program of study must be approved by the student's Advisory Committee or, depending on program requirements, the Thesis Committee.

A student who writes a master's thesis must register for a minimum of six semester hours of master's thesis. No more than six semester hours of master's thesis enrollment may be given credit in the degree program.

Students wishing to take 3000-level undergraduate courses for graduate credit will find the necessary forms on the Graduate School Web site at http://www.uark.edu/grad/. Courses numbered at the 3000 level may be taken by graduate students for graduate credit only when the courses are not in the student's major area of study and when the courses have been approved by the Dean of the Graduate School for graduate credit. The instructor for the course must hold graduate faculty status and must certify that he/she will make appropriate adjustments in assignments and grading scales to raise the level of expectation for the student to the graduate level. No more than 20 percent of the graded course work in the degree program may be comprised of 3000-level courses carrying graduate credit. Undergraduate courses numbered below 3000 will not be allowed to carry graduate credit.

Under ordinary circumstances graduate registration is limited to 18 hours for any one semester including undergraduate courses and courses audited. Registration above 15 hours must be approved by the Graduate Dean.

All requirements for a master's degree must be satisfied within six consecutive calendar years from the first semester of enrollment in the program.

Transfer of Credit. The University of Arkansas will permit a student to transfer six hours of graduate credit from an accredited graduate school in the United States, provided that the grades are "B" or better, and the subjects are acceptable to the program concerned, as a part of the master's program. (The transfer of graduate credit from institutions outside the United States is at the discretion of the Graduate Dean.) This does not, however, reduce the minimum requirement of 24 weeks of residence for the master's degree as set by state law. Students contemplating transfer of credit should consult with the Graduate School Office in advance. Please see transfer of credit regulations, below.

Note: Graduate courses transferred and used as requirements for a degree at another university cannot be used for a degree at this institution.

Transfer of Credit Regulations Established by the Graduate School for the Various Master's Degrees:

Transfer of Credit is permissible for master's programs only. Transfer of credit is not acceptable for doctoral degrees. For doctoral candidates, at the discretion of the advisory committee, the program of study may be adjusted in lieu of work taken at other colleges or universities and recognized by the candidate's committee, but it will not appear on the University of Arkansas academic record.

Criteria for Acceptable Transfer Credit:

1. The course must have been regularly offered by a regionally accredited graduate school.
2. The course must not have been used to satisfy a requirement for any degree previously granted.
3. The course must have been a bona fide graduate level course, approved for graduate credit and taught by a member of the graduate faculty.
4. The student desiring to transfer graduate credit must have been enrolled as a graduate student in the graduate school at the institution offering the course.
5. The course must appear on an official transcript as graduate credit from the institution offering the course.
6. The course grade must be a "B" or "A." (The student's grade-point average is NOT to include grades on transfer courses.)
7. The course must be recommended by the student's major adviser and be applicable to the degree requirement at the University of Arkansas.
8. The course must not have been taken by correspondence or for extension credit.
9. The course must be acceptable to the department concerned and to the Graduate Dean.
10. The student must have satisfied the 24-week residence requirements. (The student must have satisfactorily completed a total of 24 hours of graded graduate course work taken in residence.)
11. The course must have been taken within the time limit of the student's program at the University of Arkansas.
12. Credit from foreign universities is typically not acceptable for transfer because of academic and procedural differences between U.S. regionally accredited and foreign institutions, but petition may be made to the Graduate Dean on a case by case basis.

Note: Graduate credit cannot be transferred to satisfy any of the requirements for the M.B.A. degree unless the school at which the course was taken is accredited by A.A.C.S.B. This requirement is not specified by the Graduate School, but by the Graduate School of Business.

Residence Requirements. The candidate must present a minimum of 24 course hours taken in residence at the University of Arkansas, Fayetteville. A total of 12 hours of residence may be accredited from University of Arkansas off-campus graduate courses (restriction does not apply to graduate degree programs offered through the Graduate Residence Centers, see page 21) or for work done in off-campus classes held in Fayetteville. Acceptance of transferred credit does not reduce the minimum residence requirement of 24 course hours.

Thesis. The title of the thesis must be recommended by the thesis director and the thesis committee and be approved by the Dean of the Graduate School at least three months before the date of the compre-

hensive examination. The thesis must be submitted for approval to the thesis committee consisting of a minimum of three faculty members who have been approved by the Dean of the Graduate School. This committee must receive the thesis at least three weeks prior to the comprehensive examination which is to be completed at least one week before the degree is to be conferred. In the situation when there is a split decision among committee members of a master's program advisory or thesis committee, majority rules. Upon acceptance of the thesis by the thesis committee and at least one week before graduation, two typewritten copies of the unbound thesis in prescribed form must be delivered to the Graduate Dean for approval before it is deposited in the Mullins Library. All copies of the thesis must include original signatures of the student's thesis committee of record as approved and filed in the Graduate Dean's Office. Signatures of persons other than those of the official thesis director and members of the thesis committee are unacceptable.

Beginning with the May 2005 graduation, students must submit an abstract with the thesis. An abstract is defined as a 150-200 word synopsis of the thesis. See the Graduate School's *Guide to Preparing Theses and Dissertations*.

Also, beginning with the summer 2006 graduation, students will be required to submit their theses to University Microfilms Incorporated (UMI). There will be an additional charge for this submission.

Comprehensive Examination. In addition to completing other requirements, the candidate for a master's degree must take a comprehensive examination, which may be oral and/or written as recommended by the major department. If the student has completed a thesis, the final defense of the thesis must be oral. This can substitute for the comprehensive examination, if the department so chooses. If the final defense of the thesis substitutes for the comprehensive examination, the examination may include other aspects of the candidate's graduate work. All members of the thesis committee (and advisory committee, if the thesis defense substitutes for the comprehensive examination) must participate in the thesis defense unless the Dean of the Graduate School has approved an exception. While this examination is typically not open to the public (unlike the doctoral dissertation defense), the student's committee chair may, with the approval of the student, open the defense to selected members of the public. Questions from the public are at the discretion of the committee chair. The chair will insure that questions from the public are appropriate by disallowing those which are not.

Grade-Point Average. To receive a master's degree, a candidate must present a minimum cumulative grade-point average of 2.85 on all graduate courses required for the degree, unless the department requires a higher grade point average. Failing to earn such an average on the minimum number of hours, the student is permitted to present up to six additional hours of graduate credit to accumulate a grade-point average of 2.85. In the computation of grade point, all courses pursued at this institution for graduate credit (including any repeated courses) shall be considered. Students who repeat a course in an endeavor to raise their grade must count the repetition toward the maximum of six additional hours. Individual departments may have higher grade standards.

Split Decisions among Advisory and Thesis Committees. When a split decision occurs among committee members of a master's advisory or thesis committee, the majority decision will hold.

MASTER OF ACCOUNTANCY

See the Graduate School of Business, page 171.

MASTER OF ARTS IN TEACHING

The Master of Arts in Teaching (M.A.T.) degree program is a 33 semester hour degree offered in consecutive summer, fall, and spring semesters with initial enrollment in the summer semester. The M.A.T. degree is the initial certification program for students at the University of Arkansas and has six areas of emphasis: agricultural education, childhood education, middle level education, physical education, secondary education, and vocational education. Students are selected up to the maximum number designated for each cohort area of emphasis. Admission requirements for the M.A.T. degree for initial certification are: completion of an appropriate undergraduate degree program; a cumulative grade-point average of 2.7 in all previous courses (Note: some programs require a higher grade-point average – consult your faculty adviser); admission to the Graduate School; admission to Teacher Education program; completion of the pre-education core with a minimum of a "C" grade in all courses; completion of all prerequisite courses in the teaching field; successful completion of all required Praxis I and II exams; and payment of an internship fee.

The M.A.T. degree requires the completion of 10 to 12 hours of core courses to be selected from the following: CIED 5012, Measurement/Research/Statistical Concepts for Teachers; CIED 5022, Classroom Management Concepts for Teachers; CIED 5032, Curriculum Design Concepts for Teachers; CIED 5042, Reading and Writing Across the Curriculum; CIED 5052, Seminar: Multicultural Issues; and ETEC 5062, Teaching and Learning with Computer-Based Technologies. In addition, students must complete course work in their areas of emphasis, and a six hour internship is required. All M.A.T. students must participate in a comprehensive examination and one of the following: project, internship, directed research, and/or student portfolio. To receive the degree, a candidate must present a minimum cumulative grade-point average of 3.0 on all graduate courses required for the degree.

For information on the areas of specialization, refer to the sections of this catalog on agricultural education, childhood education, middle level education, physical education, secondary education, and vocational education.

Admission to candidacy, residence requirements, and other requirements are the same as for the Master of Education degree.

Teacher Licensure and licensure of other School Personnel: The approved program of study for initial teacher licensure at the University of Arkansas, except for Music and Art Education and Agricultural Education, is the Master of Arts in Teaching (M.A.T.) degree program. The M.A.T. degree program is offered in consecutive summer, fall, and spring semesters with initial enrollment in the summer semester. The M.A.T. is a graduate degree program and requires a minimum of 33 semester hours. The M.A.T. degree program has six areas of emphasis: agriculture education, childhood education, middle level education, physical education, secondary education, and vocational education. Consult the Admission Process for Initial Teacher Licensure Stages I-IV and this catalog for admission and graduation requirements for the M.A.T. degree program.

The State Board of Education issues the regulations governing the licensure of teachers in Arkansas. The Board specifies minimum cut-off scores for the Praxis I and Praxis II exams. Each application for a teacher's license or a request to add an additional license or endorsement area requires completion of an approved program of study and documentation of passing the Praxis exams. Those wishing to add an additional license or endorsement should contact the Coordinator of Teacher Education for the approved program of study.

The Bumpers College of Agriculture, Food and Life Sciences, College of Education and Health Professions, Fulbright College of Arts and Sciences, and the University Teacher Education Board for Initial Certification have developed the preparation programs leading to initial teacher licensure. The Coordinator of Teacher Education will recommend students for initial teacher license who have submitted the licensing packet and successfully completed the appropriate approved program and all state licensure requirements. Consult the

Coordinator of Teacher Education for licensure information at 117 Peabody Hall, 479-575-6740, or from the Arkansas Department of Education, 501-682-4342. Students must follow the licensure guidelines as set forth by the Arkansas Department of Education.

Academic Regulations for Professional Education Programs

Admission Process for Initial Licensure:

Stage I: Enrolling in an Undergraduate Degree Program Leading to a Potential Teacher Licensure Field. Potential fields include the following:

- Agricultural Education – B.S.A.
- Art Education – B.F.A.
- Elementary Education – B.S.E.
- Human Environmental Sciences Education – B.S.H.E.S.
- Kinesiology K-12 – B.S.E.
- Middle Level Education – B.S.E.
- Music Education – B.M.
- Secondary Education – B.A., B.S.
- Vocational Education – B.S.E.

Stage II: Complete an Evaluation for Internship by October 1 prior to entering the M.A.T. Art and music students should complete the evaluation by October 1 prior to a fall internship and March 1 prior to a spring internship. Satisfactory completion of this form does not guarantee admission to the M.A.T. degree program or other teacher education programs. This form can be downloaded from the College of Education and Health Professions Web site. The form must be completed and returned to the Coordinator of Teacher Education, 117 Peabody Hall. All requirements must be met to be cleared for the internship. The form is available from the college Web site at www.uark.edu/depts/coehp/certification.htm.

Students must meet the following criteria to be cleared for internship:

1. Successful completion of the PRAXIS I test by meeting or exceeding the Arkansas Department of Education cut-off scores. This test should be taken after the student has completed 30 credit hours and upon completion of ENGL 1013, ENGL 1023, and MATH 1203. Please note that several departments have additional program requirements regarding the Praxis I and II. Please consult with your adviser for additional requirements.
2. Obtain a "C" or better in the following pre-education core courses: CIED 1002, CIED 1011, CIED 3023 (PHED 3903 for KINS K-12 majors), CIED 3033, ETEC 2001, ETEC 2002L. For Middle Level Education and Elementary Education a minimum of "C" or higher must be earned in ENGL 1013, 1023, 2003, COMM 1313, and MATH 1203 unless University of Arkansas exemption is earned in one or more of the courses.
3. Complete additional licensure requirements. COEHP majors take either HLSC 1002 or 1103 and PEAC 1621. PHED majors take either HLSC 1002 or 1103 and PHED 3042. ELED and MDLV majors take HIST 3383. SEED Social Studies students take either HIST 4583 or HIST 3383 and any ECON course.
4. Secondary Education majors except for Art and Music majors, must complete the following courses with a grade of "C" or higher: CIED 3023 or 4023, CIED 4131, ETEC 2001/2002L, or demonstration of computer competencies in a portfolio.
5. Obtain a "C" or better in the six hours of program-specific courses. (See your adviser for information.)
6. Schedule a visit with your adviser for additional requirements including admission to upper-division courses.
7. The student should consult with his/her adviser regarding PRAXIS II requirements.
8. Earn a cumulative GPA of 2.70 or higher in the undergraduate degree program (special conditional admission will be considered on a case-by-case basis for students with a GPA between 2.5 and 2.69). Some programs require a higher GPA. Consult your adviser for the GPA requirements for your program.

Stage III: Admission to M.A.T. Degree Program

Please consult with your faculty adviser for additional requirements set by your program. The following minimum criteria are necessary to be eligible for consideration for admission:

1. Meet all requirements in Stages I & II.
2. Complete an appropriate undergraduate degree program.
3. Earn a cumulative GPA of 2.70 or higher in all previous courses completed as part of a bachelor's degree program. Some programs require a higher GPA. Consult your adviser for the GPA requirements for your program.
4. Obtain recommendation for admission from M.A.T. program area based on successful completion of portfolios, evaluation for internship, GPA requirements, course work requirements, selected written recommendations, an interview, and other requirements specified by your program.
5. Obtain admission to the Graduate School

Enrollment in each cohort will be limited. Transfer students will be allowed to enter the program on a space-available basis and must progress through all three admission stages.

Stage IV: Graduation requirements for the Master of Arts in Teaching (M.A.T.)

1. Meet all requirements in Stages I – III.
2. Earn a minimum cumulative GPA of 3.00.
3. Complete a minimum of 33 graduate semester hours as specified by program area.
4. Satisfactorily complete an internship. The internship will be completed at a school/district in Benton or Washington counties that has been approved by the Northwest Arkansas Partnership Steering Committee.
5. Pass the appropriate Praxis test (see adviser for the appropriate test) by meeting or exceeding the Arkansas Department of Education cut-off scores. The test is required for most programs. Please consult with your adviser.
6. Successfully complete the comprehensive examination.
7. Consult with your adviser for other requirements.
8. Apply for degree at the Graduate School, 119 Ozark Hall

Licensure

Students who have completed Stages I – III must obtain a licensure packet from the Coordinator of Teacher Education, Peabody Hall room 117, prior to entering internship.

Note: Students should always consult the Coordinator of Teacher Education for licensure requirement changes. Students will not be licensed to teach in Arkansas until they have met all requirements for licensure as set forth by the Arkansas Department of Education.

Note: Students who have completed the B.M. or B.F.A. in music or art education and have completed the internship may obtain the licensure packet from the Coordinator of Teacher Education, Peabody Hall room 117.

Usually licensure in another state is facilitated by qualifying for a license in Arkansas. An application in another state must be made on the application form of that state, which can be obtained by request from the State Teacher Licensure office in the capital city. An official transcript should accompany the application. In many instances the applications are referred to the Coordinator of Teacher Education to verify program completion in teacher education.

MASTER OF BUSINESS ADMINISTRATION

See the Graduate School of Business chapter in this catalog.

MASTER OF EDUCATION

The degree of Master of Education (M.Ed.) is offered with areas of concentration in educational administration, educational technology, elementary education, higher education, physical education, recreation, secondary education, special education, and workforce development education. The degree of Master of Science (M.S.) is offered in communication disorders, counseling, health science, kinesiology, and rehabilitation.

General minimum requirements for the degree of Master of Education (M.Ed.) follow:

1. 27 semester hours and a thesis or 33 semester hours and no thesis.
2. A written comprehensive examination.
3. A cumulative grade-point average of 3.00.
4. A minimum residence of 24 weeks.

After a student has been admitted to the Graduate School, the student may seek acceptance into one of the several program areas of concentration offered in the Master of Education program. Upon acceptance to a program area, the student is assigned an adviser. Acceptance in a program area should be accomplished before the completion of the first graduate course. Some programs require students admitted to the master's degree program to take the Graduate Record Examinations, the Miller Analogies Test, or the National Teachers Examination. This should be accomplished prior to completion of 15 hours of graduate credit.

All Master of Education degree programs include a minimum of 33 semester hours. Nine semester hours of basic core courses are required for all M.Ed. students in three areas: Research Tools, Learning/Development Domain, and History/Philosophy Domain as follows:

1. Research Tools (students must select one course from this category): EDFD 5013, Research Methods in Education; HKRD 5353, Research in HKRD; and EDFD 5393, Statistics in Education & Health Professions.
2. Learning/Development Domain (students must select one course from this category): EDFD 5373, Psychological Foundations of Teaching and Learning; EDFD 5473, Adolescent Psychology in Education; and EDFD 5573, Life-Span Human Development; M.Ed. students in higher education may substitute HIED 5043, The Student in Higher Education.
3. History/Philosophy Domain (students must select one course from this category): EDFD 5303, Historical Foundations of Modern Education; EDFD 5353, Philosophy of Education; and EDFD 5323, Global Education. M.Ed. students in higher education and adult education may substitute HIED 5083, History and Philosophy of Higher Education. Students who are not eligible for a standard teaching certificate will be expected to complete additional work to fulfill this requirement in addition to the 33-hour graduate program. An exception to this policy is made for students who declare they are not preparing for a school position and will not seek a certificate required of professional employees in public schools.

Admission to Candidacy. Admission to candidacy will be met when the following have been completed:

1. unconditionally admitted to graduate standing.
2. accepted to a program area and assigned an adviser.
3. completion of 12 semester hours of graduate credit over and above any entrance deficiencies or conditions.

Transfer of Credit. Transfer of credit regulations established by the Graduate School for the Master of Arts and Master of Science degree apply to the Master of Education degree. (See page 37.)

The University of Arkansas also offers graduate-level courses for residence credit off the Fayetteville campus. See Graduate Resident Centers on page 21.

Residence Requirements. The candidate must be in residence a minimum of 24 weeks. A total of 12 weeks of residence or 12 semester hours of approved study may be accepted for residence credit from the University of Arkansas off-campus graduate courses. Acceptance of transferred credit does not reduce the minimum residence requirement of 24 weeks.

Graduate courses completed, but not applicable to the requirements for the master's degree the student is pursuing, will not be accepted as part of the 24-week residence required for that degree.

All requirements for a master's degree must be satisfied within six consecutive calendar years.

Other Requirements. Students who do not have a grade-point average of 3.00 upon completion of Master of Education program requirements may be allowed to submit up to six additional hours of graduate credit in residence on the Fayetteville campus or at approved Graduate Resident Centers to accumulate a 3.00 average.

The policies and procedures approved for the Master of Arts and Master of Science degrees also apply to the Master of Education degree. In addition to completing other requirements, the candidate must pass a comprehensive examination administered by the respective program area.

MASTER OF FINE ARTS (IN ART)

See Art, page 55.

MASTER OF FINE ARTS (IN CREATIVE WRITING)

See Creative Writing, page 81.

MASTER OF FINE ARTS (IN DRAMA)

See Drama, page 87.

MASTER OF FINE ARTS (IN TRANSLATION)

See Translation, page 168.

Other Requirements for MFA Degrees

The policies and procedures approved for the Master of Arts and the Master of Science degrees also apply to the Master of Fine Arts degrees. In addition to completing other requirements, the candidate must pass a comprehensive examination administered by the respective program area.

MASTER OF INFORMATION SYSTEMS

See the Graduate School of Business, page 188.

MASTER OF SCIENCE IN NURSING

See Nursing, page 139.

MASTER OF SOCIAL WORK

See Social Work, page 161.

MASTER OF TRANSPORTATION AND LOGISTICS MANAGEMENT

See the Graduate School of Business, page 190.

EDUCATIONAL SPECIALIST DEGREE

The Educational Specialist degree (Ed.S.) has four areas of specialization – counselor education, curriculum and instruction, educational administration, and higher education – and may be issued by the Graduate School to those students whose major objective is to develop educational competency in one of these specialized areas. All graduate courses applicable to this degree must be taken on the

Fayetteville campus unless otherwise specified.

All requirements for the Educational Specialist degree with specialization in educational administration may be completed at the Graduate Resident Centers in the University of Arkansas at Pine Bluff, University of Arkansas Community College at Hope, and Phillips Community College of the University of Arkansas at Helena.

Admission to the Program. Admission to the Educational Specialist degree program is based on the total profile of the applicants' educational background and their career objectives. After students have been admitted to the Graduate School, they may seek acceptance in one of the program areas of specialization. All students seeking admission must meet the following admission criteria:

1. Completed a master's degree or its equivalent in a related field.
2. Presented a Graduate Record Examinations general score on three parts (verbal, quantitative, and analytical) or a Miller Analogies Test score. These scores are considered as part of the applicant's profile. Required scores may vary within given programs.
3. Attained a cumulative grade-point average of at least 3.25 on all graduate course work before being admitted into the Specialist program.
4. Students with a 3.00 to 3.25 cumulative grade-point average in all graduate courses must present a combined minimum Graduate Record Examinations general score of 1300 on three parts (verbal, quantitative, and analytical) or 55 on the Miller Analogies Test.
5. Two years of successful professional experience, or equivalent, in an area related to the student's academic goals prior to the completion of the degree.
6. A minimum of three letters of recommendation from individuals capable of commenting on qualification for graduate study.
7. A personal interview with the program area graduate faculty. This evaluative process will subjectively measure factors such as poise, professional objectives, professional commitment, and ability to discuss professional problems.

General Requirements. All Ed.S. programs contain a minimum of 30 semester hours of graduate work beyond the master's degree in a planned program. The program for each student must include the requirements specified in the particular program to which the student has been accepted; assessed deficiencies in the area of specialization; assessed courses to meet current professional requirements of the Master of Education degree; a minimum of nine semester hours of graduate work in a related field(s) other than the area of specialization; a graduate course in research, statistics, or data processing applicable for educational specialists; and an original project, research paper, or re-port for which variable credit up to six semester hours is required. A grade-point average of 3.25 is required for the Ed.S. degree program on all work presented as part of the Ed.S. degree program.

After a student is accepted into an Ed.S. program, a committee with a minimum of three members will be appointed, and a program of study will be established outlining the minimum requirements. Only the adviser and one other member of the student's committee may be from the program area sponsoring the program. The committee's responsibilities include the determination of deficiencies, the acceptability of previous graduate work, the approval of the candidate's program of study, the approval of the original project or research paper, and the conduct of a final examination. This examination will be a comprehensive oral evaluation scheduled near the end of the candidate's program and will include one or both of the following: 1) evaluation of the original project, research paper, or report, and 2) evaluation covering material related to the background and professional preparation of the candidate. A written examination may not be taken to substitute for the oral examination. A written account of the original project, research paper, or report will be filed with the program area sponsoring the candidate's program of study.

A declaration of intent to pursue the Ed.S. program must be filed with the Dean of the Graduate School by the student immediately following the approval of the program of study. The last 30 hours of the program must be completed within a period of six years from the date of declaration. A minimum of 30 weeks of resident study at the University of Arkansas, Fayetteville, in an approved program is required. Credit earned in any University of Arkansas center, off-campus workshop or special course will not count as residence study in the Ed.S. program. The only exception is course work completed at the University of Arkansas at Pine Bluff Graduate Resident Center by students pursuing the Ed.S. degree in education with a specialization in adult education, educational administration, or vocational education; the University of Arkansas Community College at Hope Graduate Resident Center and Phillips Community College of the University of Arkansas at Helena Graduate Resident Center by students pursuing the Ed.S. degree in education with a specialization in educational administration.

Upon completion of all requirements, candidates are issued an Educational Specialist degree. Their names appear on the commencement program, but there is no distinctive academic regalia in connection with the Educational Specialist degree.

DOCTOR OF EDUCATION

The Doctor of Education (Ed.D.) degree is designed to prepare the interested student for advanced professional proficiency in a selected field of education and, in addition, to develop the ability for scholarly study of professional problems. The degree is awarded to those persons who, through their planned program, show professional growth and competence.

The Doctor of Education degree (Ed.D.) has five areas of specialization – adult education, educational administration, higher education, recreation, and vocational education.

Admission to the Program. Admission to the Doctor of Education program is based on the total profile of the applicants' educational attributes. In evaluating an application for doctoral study leading to the Ed.D. degree, particular attention is given 1) to the apparent congruence between the stated career objective and the proposed field of specialized study, and 2) to the estimated prospects of the success of the applicant both in completing the degree requirements and in fulfilling the professional expectations of the education position to which the applicant aspires if a doctoral degree is earned. Applicants must meet the following admission profile requirements for the Ed.D.:

1. All students seeking admission must have completed a master's degree or its equivalent in a related field.
2. All students must present a Graduate Record Examinations general score on three parts (verbal, quantitative, and analytical) or a Miller Analogies Test score. These scores are considered part of the applicant's profile. Required scores may vary within given programs.
3. Students must have attained a 3.50 cumulative grade-point average on all graduate courses prior to being admitted into the Ed.D. program.
4. Students with a 3.00 to 3.50 cumulative grade-point average in all graduate courses must present a combined minimum Graduate Record Examinations general score of 1500 on three parts (verbal, quantitative, and analytical) or 55 on the Miller Analogies Test.
5. All students must have three years of successful professional experience, or equivalent, in an area related to the degree pro-

gram prior to the completion of the degree.
6. All students must have a minimum of three letters of recommendation from individuals capable of commenting on qualification for graduate study.

Interested applicants must first gain admission to the Graduate School, then be accepted by a program area in education by gaining approval of a majority of the graduate faculty teaching regularly in that program area. This decision is made after the applicant has been interviewed by the program faculty.

Declaration of Intent. Immediately after formal acceptance into the Ed.D. program, students must file with the Dean of the Graduate School a statement of their intention to become a candidate for the degree of Doctor of Education. Courses taken prior to filing the Declaration of Intent cannot be used to satisfy the residence requirement for the Ed.D. degree.

The appointment and responsibility of the Doctoral Advisory Committee for the Doctor of Education degree is the same as that for the Doctor of Philosophy degree (see below).

The degree must be completed within seven consecutive calendar years from the date of the Declaration of Intent.

Residence Requirement. The residence requirement for the Doctor of Education degree may be fulfilled by selecting any one of four plans. This selection must be made in consultation with the adviser, soon after the Declaration of Intent is filed. The plan will specify a number of hours of enrollment and a number of consecutive semesters or terms in which the enrollment must be completed.

Students who also hold University appointments, other than those of Graduate Assistant, for half time or more, should see the residence requirement under the Doctor of Philosophy.

In meeting the doctoral residence requirement, candidates who hold a master's degree from the University of Arkansas must earn a minimum of 30 semester hours on the Fayetteville campus; candidates who hold a master's degree from another institution must earn a minimum of 36 semester hours on this campus. Three hours of Doctoral Dissertation may be applied toward this requirement. Doctoral students with regular outside employment responsibilities may not enroll for more than nine semester hours in each semester. Graduate work in an off-campus location, beyond that allowed on the master's degree and the Educational Specialist degree, will not count toward the minimum of 96 graduate hours required of all Ed.D. candidates.

Program of Study. A minimum of 96 semester hours of graduate study is required for the Ed.D. degree. The program of study shall consist of the major field in education and one or two additional fields of study. The dissertation and program emphasis may be in one of the following areas: adult education, educational administration, recreation, higher education, or vocational education. The nature of the program of study will vary, depending upon the field selected and the candidate's objective. Candidates for the Ed.D. degree will be required to complete: EDFD 6403, Educational Statistics and Data Processing; EDFD 6623, Techniques of Research in Education, and at least one of the following advanced statistics courses: EDFD 6413, Experimental Design in Education; EDFD 6423, Multiple Regression Techniques for Education; EDFD 6533, Qualitative Research; EDFD 699V(3), Seminar (Survey Research Methods). Each student is required to elect nine hours of work in a field(s) other than the area of specialization. A grade-point average of 3.25 is required on all work presented as part of the Ed.D. degree program and Ph.D. programs in Education fields. Candidates should meet with their faculty adviser for additional requirements.

Other Requirements. The examination for candidacy, dissertation, and final examination requirements for the Doctor of Education degree are the same as those for the Doctor of Philosophy degree.

Transfer of Credit. Transfer of credit is not acceptable for doctoral degrees. For doctoral candidates, at the discretion of the advisory committee, the program of study may be adjusted in lieu of work taken at other colleges or universities and recognized by the candidate's committee, but it will not appear on the University of Arkansas academic record.

DOCTOR OF PHILOSOPHY

Programs of advanced study leading to the degree of Doctor of Philosophy (Ph.D.) are offered in: animal science, anthropology, biology, business administration, cell and molecular biology, chemistry, comparative literature, computer science, counselor education, crop, soil, and environmental sciences, curriculum & instruction, economics, engineering, educational foundations, English, entomology, environmental dynamics, food science, health sciences, history, kinesiology, mathematics, microelectronics-photonics, philosophy, physics, plant science, poultry science, psychology, public policy, rehabilitation, and space and planetary sciences. (Note: For the Ph.D. in Business Administration and Economics, see the Graduate School of Business.)

The degree of Doctor of Philosophy is awarded in recognition of high scholarly attainment as evidenced by a period of successful advanced study with at least a 3.0 cumulative graduate grade-point average (2.85 for those students admitted to the Graduate School prior to Fall 2001), the satisfactory completion of certain prescribed examinations, and the development of a dissertation covering some significant aspect of a major field of learning.

Declaration of Intent. Students who wish to become candidates for the degree of Doctor of Philosophy are expected to complete work equivalent to the requirements for the master's degree as determined by program faculty and must file a statement of their intention to become doctoral candidates with the Dean of the Graduate School upon registration for their first semester of graduate work beyond the master's degree or its equivalent. A student cannot satisfy any part of the residence requirement for the doctoral degree until after a Declaration of Intent has been filed with the Dean of the Graduate School.

Immediately after the student has filed a Declaration of Intent and indicated the major field of study (for those programs making use of an advisory committee) a Doctoral Program Advisory Committee will be appointed, with the approval of the Dean of the Graduate School, from the graduate faculty to evaluate the student's preparation and fitness for further graduate work. If the student is allowed to continue as a prospective candidate for the doctoral degree, this committee will serve in an advisory capacity in working out and directing a suitable program of advanced study and investigation. The student's major adviser shall serve as chair of the committee. Appointment of this committee does not constitute admission to candidacy for the degree of Doctor of Philosophy, a very important and significant step in the student's graduate career, which must be taken after the student has completed approximately two years of graduate work beyond the baccalaureate degree.

The degree must be completed within seven consecutive calendar years from the date of the Declaration of Intent.

Purpose of the Residence Requirement. Residence requirements are intended to insure that every doctoral student has ample opportunity for the major intellectual development, which can result from a sustained period of intensive study and close association with other scholars in the intellectual environment of the University. The requirement recognizes that growth as an independent scholar is not merely a matter of class attendance but rather involves a broader development of the intellect which comes about through intensive study, independent research, sustained association with faculty members and other colleagues who share common scholarly and professional interests, attendance at seminars and colloquia, intensive

reading and familiarization with library resources, consultation with specialists in other disciplines and resource centers, and the opportunity for broadened exposure to current intellectual issues as they are revealed in various campus offerings.

Residence Requirement. After filing a Declaration of Intent to pursue the doctoral degree, a student must fulfill a residence requirement by completing a minimum of two consecutive semesters of full-time graduate study (nine hours or more per semester), either fall-spring, spring-fall, spring-summer or summer-fall (minimum 3 hours of registration in the summer). This period of residence is independent of, and in addition to, that required for any other graduate degree. (Note: Individual degree programs may have different residency requirements.) During this period of residence, the student must be continually involved on a full-time basis with the on-site academic, scholarly, and research activities of the academic department (or corresponding academic unit) in which the degree program is administered.

A student who does not concurrently hold appointment as a Graduate Assistant must satisfactorily complete a minimum of nine semester hours, including dissertation credits, during each semester or summer counted in the residence period. For degree purposes, any graduate credit course offered by the University of Arkansas, Fayetteville, via distance education (regardless of class sites) will be counted as residence credit. For students who hold appointments as Graduate Assistants this requirement is six semester hours per semester if the appointment is for 50 percent time and nine semester hours per semester if the appointment is for 25 percent time. A student not on an assistantship who intends to satisfy one semester of the residence period during the summer must satisfactorily complete a minimum of nine semester hours of such work during the summer. For a student holding a concurrent assistantship of 25 percent or 50 percent time in the summer, this requirement is three semester hours per any five- or six-week summer session.

Students who also hold University appointments, other than those of Graduate Assistant, for half time or more will be considered to contribute to the residence requirements only for semesters or 12 weeks in the summer during which all of the following criteria are met: 1) the duties of the appointment primarily involve degree-related academic or scholarly activities such as dissertation research; 2) the departmental chairperson (or corresponding administrator) and the student's Doctoral Program Advisory Committee certify that the duties of the appointment do not interfere with the appointee's regular participation as a student, on an essentially full-time daily basis, in the normal on-site academic, scholarly, and research activities of the department and degree program and the associated scholarly demands thereof; 3) the student is enrolled in a minimum of two consecutive major semesters of six semester hours, or a minimum of consecutive enrollment of a minimum of six hours in one major semester and a minimum summer term of three hours; and 4) file a plan for approval by the Graduate Dean in advance of satisfying residence requirements.

Program of Study. The objectives of the program of study leading to the degree of Doctor of Philosophy shall be scholarly achievement of high order and the development of a fundamental understanding of the major field and its relation to supporting fields of knowledge, rather than the satisfactory completion of a certain number of credit hours. The nature of the program of study will vary somewhat, depending upon the major field of study and the objective of the prospective candidate

Transfer of Credit. Transfer of credit is not acceptable for doctoral degrees. For doctoral candidates, at the discretion of the advisory committee, the program of study may be adjusted in lieu of work taken at other colleges or universities and recognized by the candidate's committee, but it will not appear on the University of Arkansas academic record.

Grade-Point Average Requirement. A minimum cumulative graduate grade-point average of 3.0 is required to earn a Doctor of Philosophy degree. Note: For students admitted to the Graduate School prior to Fall 2001, the minimum cumulative graduate grade-point average required to earn a Doctor of Philosophy degree was 2.85.

Language Requirement. Foreign language requirements for the Doctor of Philosophy degree vary from department to department. For specific details see departmental statements. These requirements should be completed early in the doctoral program.

Examination for Candidacy. After completing approximately two years of graduate study, the prospective candidate must take candidacy examinations in specified fields of study in accordance with the requirements of the department in which the candidate is working. These examinations may be either written or written and oral. Upon satisfactorily completing these examinations, the student may be admitted to candidacy and may proceed to work toward completion of the remaining requirements for the degree. Note: The Graduate School considers the Advisory Committee to be responsible for administering and evaluating the candidacy examinations, but degree programs may have different structures.

Registration. All doctoral students who have been admitted to candidacy must enroll in a minimum of one hour of dissertation credit every semester (fall, spring, summer) until they graduate. Under unusual circumstances, this enrollment requirement may be waived for post-candidacy doctoral students for up to two years, with an approved request for a leave of absence. See the Graduate School Registration and Leave of Absence Policy on page 35.

Dissertation. Each candidate must complete a doctoral dissertation on some topic in the major field. The topic assignment shall be made and a title filed with the Dean of the Graduate School at least one year before the final examination, the specific problem and subject of the dissertation to be determined by the major adviser, the candidate, and the advisory committee. The completed dissertation must be a definite, scholarly contribution to the major field. This contribution may be in the form of new knowledge of fundamental importance, or of modification, amplification, and interpretation of existing significant knowledge.

Each doctoral candidate must register for a minimum of 18 hours of doctoral dissertation. After the student has passed the candidacy examinations, the student must register for at least one hour of dissertation each semester and one hour during the summer session until the work is completed, whether the student is in residence or away from the campus. For each semester in which a student fails to register without prior approval of the Dean of the Graduate School, a registration of three hours will be required before the degree is granted.

Three typewritten copies of the completed dissertation in the prescribed form must be presented to the candidate's advisory committee for approval at least six weeks before final defense of the dissertation. After approval by the committee and the Dean of the Graduate School, two copies must be deposited in the Mullins Library at least two weeks before the degree is to be conferred, together with two copies of an abstract, of not more than 350 words, approved by the major adviser as suitable for publication. The third copy of the dissertation shall be presented to the candidate's major department.

Final Examination. The candidate's final examination for the degree of Doctor of Philosophy will be oral. The major adviser will forward to the Dean of the Graduate School, not less than ten days before the date of the final oral examination, an abstract of the dissertation accompanied by a memorandum announcing the date, time, and place of the oral examination. The examination will be primarily concerned with the field of the dissertation, but may also include other aspects of the candidate's graduate work. The doctoral dissertation committee is responsible for insuring that the dissertation

contributes new knowledge of fundamental importance or significantly modifies, amplifies, or interprets existing knowledge in a new and important manner. All members of the dissertation committee must participate in the final oral defense of the dissertation unless the Dean of the Graduate School has approved an exception. While this examination is open to the public, the exam is controlled by the student's committee chair. Questions from the public are at the discretion of the committee chair. If the committee chair expects to allow questions from the public, the student must be so advised. The chair will insure that questions from the public are appropriate by disallowing those which are not.

Split Decisions Among Advisory and Dissertation Committees. In the situation when there is a split decision among committee members of a doctoral program advisory or dissertation committee, the situation must be resolved to the satisfaction of each committee member. In the event that each committee member is not satisfied, the committee member may insist on the necessary steps to reach a resolution or elect to step down from the committee. In unusual circumstances, the Dean of the Graduate School may remove a faculty member from a student's thesis/dissertation or advisory committee, or make an alternative arrangement (e.g., assign a representative from the Graduate faculty to serve on the committee).

The Graduate School
Departments and Course Descriptions

HOW TO READ COURSE DESCRIPTIONS

The following courses are offered by the Graduate School of the University of Arkansas. Each course is identified by a four-digit number, which carries the following information:

The first three digits identify the course, the first digit denoting course level. The fourth digit indicates semester credit hours.

The letter "V" is used in place of the last digit for those courses in which credit is variable, the minimum and maximum credit being given in parentheses after the course title.

A suffix to the course number will provide further identification. An "L" denotes a laboratory. Other suffixes may be found in the class schedule.

As nearly as can be determined in advance, the semester in which each course will be offered is designated by a symbol in parentheses placed immediately after the course title.

- Courses marked (FA) will be offered in the fall semester.
- Courses marked (SP) will be offered in the spring semester.
- Courses marked (SU) will be offered during one or both terms of the summer session.

Where there are prerequisites to a course, these are noted following the description. Students are urged to check prerequisites before enrolling in any course, and to consult their advisers whenever there is any question of prerequisites having been satisfactorily completed. Note: Graduate degrees are not offered in each of these fields. For degrees offered, see page 15.

Course Prefixes (Alpha Codes)

AAST	African American Studies
ACCT	Accounting
ADED	Adult Education
AERO	Aerospace Studies
AFLS	Agricultural, Food and Life Sciences
AGEC	Agricultural Economics
AGED	Agricultural Education
AGME	Agricultural Mechanization
AGST	Agricultural Statistics
AIST	Asian Studies
AMST	American Studies
ANSC	Animal Science
ANTH	Anthropology
ARAB	Arabic
ARCH	Architecture
ARED	Art Education
ARHS	Art History
ARSC	Arts and Sciences
ARTS	Art
ASTR	Astronomy
BENG	Biological Engineering
BIOL	Biology
BLAW	Business Law
CDIS	Communication Disorders
CEMB	Cell and Molecular Biology
CENG	Computer Engineering
CHEG	Chemical Engineering
CHEM	Chemistry
CHIN	Chinese
CIED	Curriculum and Instruction
CLST	Classical Studies
CMJS	Criminal Justice
CNED	Counselor Education
COMM	Communication
CPLT	Comparative Literature and Cultural Studies
CSCE	Computer Science
CSES	Crop, Soil, and Environmental Sciences
CVEG	Civil Engineering
DANC	Dance
DEAC	Dance Education/Activity
DRAM	Drama
EASL	English As A Second Language
ECON	Economics
EDAD	Educational Administration
EDFD	Educational Foundations
EDUC	Education
ELED	Elementary Education
ELEG	Electrical Engineering
ENDY	Environmental Dynamics
ENGL	English
ENSC	Environmental Science
ENTO	Entomology
ENVD	Environmental Design
ETEC	Educational Technology
EUST	European Studies
EXED	Extension Education
FDSC	Food Science
FIIR	Fulbright Institute of International Relations
FINN	Finance
FLAN	Foreign Languages
FREN	French
GEOG	Geography
GEOL	Geology
GEOS	Geosciences
GERM	German
GERO	Gerontology
GNEG	General Engineering
GREK	Greek

HESC	Human Environmental Sciences
HIED	Higher Education
HIST	History
HKRD	Health Science, Kinesiology, Recreation and Dance
HLSC	Health Science
HNED	Education Honors
HORT	Horticulture
HUMN	Humanities
INEG	Industrial Engineering
ISYS	Information Systems
ITAL	Italian
ITED	Industrial and Technical Education
JAPN	Japanese
JOUR	Journalism
KINS	Kinesiology
LARC	Landscape Architecture
LAST	Latin American Studies
LATN	Latin
LAWW	Law
MATH	Mathematics
MBAD	Master's of Business Administration
MEEG	Mechanical Engineering
MEPH	Microelectronics-Photonics
MEST	Middle East Studies
MGMT	Management
MILS	Military Science
MKTG	Marketing/Logistics
MLIT	Music Literature
MUAC	Applied Music (Class)
MUAP	Applied Music (Private)
MUED	Music Education
MUEN	Music Ensemble
MUHS	Music History
MUPD	Music Pedagogy
MUSC	Music
MUSY	Musicology
MUTH	Music Theory
NURS	Nursing
OMGT	Operations Management
PADM	Public Administration
PEAC	Physical Education (Activity)
PERS	Persian
PHED	Physical Education
PHIL	Philosophy
PHSC	Physical Science
PHYS	Physics
PLPA	Plant Pathology
PLSC	Political Science
PORT	Portuguese
POSC	Poultry Science
PSYC	Psychology
PTSC	Plant Science
PUBP	Public Policy
RDNG	Reading
RECR	Recreation
RHAB	Rehabilitation Education
RSOC	Rural Sociology
RSST	Russian Studies
RUSS	Russian
SCWK	Social Work
SEED	Secondary Education
SOCI	Sociology
SPAC	Space and Planetary Sciences
SPAN	Spanish
SPED	Special Education
STAT	Statistics
TLOG	Transportation and Logistics
UACS	Clinton School
VAED	Vocational and Adult Education
VOED	Vocational Education
WCIV	Western Civilization
WCOB	Business
WDED	Workforce Development Education
WLIT	World Literature

Changes in Catalog Information

This catalog contains information that should be accurate at the time of completion. However, regulations, fees, programs of study, and individual courses are regularly revised, and the catalog information is, thus, subject to change.

Students are expected to keep informed concerning current regulations, policies, and program requirements in their fields of study and must meet all requirements of the degree programs in which they are enrolled. Courses that are modified or added to a curriculum and that are incorporated into the curriculum at a level beyond that at which a student is enrolled may become graduation requirements for that student. Courses that are incorporated into the curriculum at a level lower than the one at which the student is enrolled are not required for that student.

The most current information, including a full listing of all Graduate School policies, may be found on the Graduate School Web site at http://www.uark.edu/grad.

ACCOUNTING (ACCT)

See Graduate School of Business, page 180.

ADULT EDUCATION (ADED)

Barbara E. Hinton
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Web: http://www.uark.edu/depts/coehp/VAED.htm/

- Professors Biggs, Daugherty, Dutton, Hinton, Thompson (C.)
- Associate Professors DeVore, Nafukho, Orr, Park, Thompson (D.)
- Assistant Professors Banks, Beck, Brooks, Mungania

Degrees Conferred:

M.Ed. in Workforce Development Education (WDED)
Ed.D. (EDUC)

Master of Education Degree in Workforce Development Education: The basic M.Ed. program is a 33-hour non-thesis program. This is a non-teacher licensure program; however, licensure and/or endorsement is available for public school teachers who meet the requirements. The student's program of study consists of the requirements listed below. The degree consists of a common college core (9 hours) and a common program core (6 hours). All

candidates who seek admission to the program must have a cumulative grade-point average of 2.70 or higher, or a 3.2 or higher on the last 60 hours, demonstrate professional promise, and have obtained a bachelor's degree from an accredited institution.

Degree Requirements: 33 hours

1. College of Education and Health Professions Core: 9 hours
2. Workforce Development Education Core: 6 hours
3. Specialty Studies: 9 hours
4. Electives: 3-9 hours

Doctoral Studies: The program has proposed a reconfigured doctorate in Workforce Development Education to replace the Ed.D. in Adult Education and the Ed.D. in Vocational Education. Please see our Web site at http://www.uark.edu/depts/coehp/ VAED.htm/ for our progress on this proposal.

Adult Education (ADED)

ADED5113 Adult Learner: The Later Years (Sp, Su, Fa) Directed toward people who are most likely to interact with older adults in a learner setting. Emphasis is on understanding the educational needs, wants, and characteristics of older learners so that appealing, valuable, and efficient instruction can be developed.
ADED5123 Nontraditional Student (Sp, Su, Fa) An overview of activities that could ultimately promote greater access and success for adult learners with higher education.
ADED5213 Teaching Reading to Adults (Sp, Su, Fa) A practically-oriented course enabling the ABE/GED teacher to improve the reading program by developing skill in the identification of the reading difficulties of adult students and in the use of suitable strategies for helping these adults overcome their difficulties. Emphasis on diagnostic-prescriptive reading instruction and will include the following 3 main components: the adult as a learner; assessing reading needs in adult basic education; and developing reading skills for the adult learner.
ADED5303 Contemporary Issues in Adult Education (Sp, Su, Fa) Examines issues of methodology, theories, materials, and programming currently emerging in the field of adult education. Discussion focus upon timely topics as they appear in the professional publications.
ADED560V Workshop (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
ADED574V Internship (Sp, Su, Fa) (1-18)
ADED599V Seminar (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
ADED700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

Vocational and Adult Education (VAED)

VAED605V Independent Study (Irregular) (1-18)
VAED6113 Administrative Leadership for Vocational and Adult Education (Sp, Su, Fa) The function of administering vocational and adult education programming is addressed through the study of leadership style, function, and constituency.
VAED6133 Instructional Management in Vocational and Adult Education (Sp, Su, Fa) An analysis of designing and managing vocational and adult instructional programs with competency developing in directing curriculum development, improving instruction, formulating schedules, and installing competency-based education.
VAED6143 Student Services in Vocational and Adult Education (Sp, Su, Fa) A comprehensive course which includes managing student recruitment and admissions, providing systematic counseling and guidance services, maintaining overall school discipline, establishing a student placement service, and coordinating follow-up studies.
VAED6213 Curriculum Development in Vocational and Adult Education (Sp, Su, Fa) Determining principles of curriculum development, organizing curricula, and evaluating curriculum materials with special reference to vocational and adult education.
VAED6303 Program Planning and Evaluation in Vocational and Adult Education (Sp, Su, Fa) Emphasis is given to understanding the theoretical foundation upon which the programming process is predicated, developing a theoretical mode, and acquiring the conceptual tools necessary for analyzing the programming process in any vocational or adult education organization.
VAED6403 Special Topics in Human Resource Development (Sp, Su, Fa) Designed for persons interested in exploring topics specific to vocational and adult education and human resource development in business and industry settings. Emphasis given to examining vocational and adult education research as applied in the public and private sector.
VAED6443 Program Evaluation in Human Resource Development (Even years, Sp) This course is a doctoral level course designed as an introduction to program evaluation in human resource development, training, and other HRD interventions. Emphasis is on (a) systems thinking applied to evaluation, (b) organizational development and program improvement, and (c) the integration of evaluation with strategic planning and performance improvement.
VAED6453 Training in the Workplace (Sp, Su, Fa) An introduction to and survey of current theories and practices in training in the workplace. Students are expected to explore selected interdisciplinary topics in areas such as adult education, vocational education, human resource development, organizational behavior, instructional technology, and economics as they relate to training in the workplace.
VAED674V Internship (Irregular) (1-18) Prerequisite: advanced graduate standing.
VAED680V Educational Specialist Project (Irregular) (1-6) An original project, research paper, or report required of all Ed.S. degree candidates. Prerequisite: admission into E.D.S. program.
VAED692V Directed Field Experience (Irregular) (1-18) Teaching and supervision in secondary or post-secondary schools or work in business or industry under guidance. For students who desire or need directed experience.
VAED699V Seminar (Irregular) (1-18) May be repeated for 18 hours.

AGRICULTURAL & EXTENSION EDUCATION (AEED)

Donald R. Herring
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Web: http://www.uark.edu/depts/aeedhp/

- Professors Graham, Herring, Johnson, Wardlow
- Adjunct Professors Baker, Lyles
- Associate Professors Arthur, Miller, Scott
- Visiting Instructor Cox

Degrees Conferred:

M.A.T. in Agricultural Education (AGED) (See Agricultural Education)
M.S. (AEED)

Areas of Concentration: Agricultural education or extension education, and a technical area.

Primary Areas of Faculty Research: Agricultural teacher education; extension and non-formal education; agricultural systems technology management; and agricultural communications.

Prerequisites to Degree Program: Bachelor's degree in a closely allied field. Some deficiency courses may be assessed depending on the background and educational objectives of the student.

Requirements for the Master of Science (M.S.) Degree: This program requires 33 semester hours, and students may choose between a thesis or non-thesis option. Students in the thesis option complete a written thesis (six hours), and students in the non-thesis option substitute additional course work as specified by their graduate committee. Core courses (12 hours) are specified by departmental graduate faculty and include: research methods, statistics, technical writing or AGED 5473, and philosophy of agricultural and extension education. The remaining hours (15 for thesis option, 21 for non-thesis option) may be taken in a technical area or agricultural and extension education. The thesis will be done on a research problem which bridges agricultural education or extension education, with the technical area.

Agricultural Education (AGED)

AGED4143 Electronic Communications in Agriculture (Even Years, Sp) An overview of communication technology in the agricultural, food and life sciences.
AGED4243 Publication Production in Agriculture (Odd Years, Sp) Theory and practice of planning, editing, designing, and producing publications commonly used in agriculture, extension and related industries.
AGED475V Internship in Agri Educ (Sp, Su, Fa) (1-6) Scheduled practical field experiences under the supervision of a professional practitioner in off-campus secondary school systems. Emphasis includes classroom preparation, teaching, and student evaluation. Prerequisite: admission into Clinical Practice. May be repeated for 6 hours.
AGED5001 Seminar (Sp) Presentations and discussion of graduate student research

as well as review of current literature and topics of current interest by students and faculty. All graduate students will make at least one formal presentation.

AGED5013 Advanced Methods in Agricultural Mechanics (Fa) Emphasis on shop organization and management, courses of study, unit shop instruction, and development of skills in agricultural mechanics.

AGED5031 Ethics in Agricultural and Extension Education (Fa) A study of ethics as applied to problems of professional practice. The focus will be on case studies.

AGED5033 Developing Leadership in Agricultural Organizations (Fa) Organizational concepts of leadership; administrative styles and structures; leadership for boards, committees, governmental bodies, and review of societal and political processes. Prerequisite: graduate standing.

AGED5053 Philosophy of Agricultural and Extension Education (Sp) An examination and analysis of social and economic events leading to the establishment and maintenance of federal, state, county, and local agricultural education programs. Lecture 3 hours per week. Prerequisite: graduate standing.

AGED5074 Program Management Practicum (Sp) A course involving activities emphasizing the practical application of theory in on-the-job experiences in program management; must be taken in conjunction with AGED 575V. Prerequisite: Admission into the MAT program.

AGED510V Special Problems (Sp, Su, Fa) (1-6) Individual investigation of a special problem in agricultural education which is not available through regular courses. These will be directed by a member of the graduate faculty. Prerequisite: graduate standing.

AGED520V Special Topics in Agricultural and Extension Education (Irregular) (1-4) Topics not covered in other courses or a more intensive study of specific topics in agriculture education. Prerequisite: graduate standing. May be repeated for 99 hours.

AGED5463 Research Methodology in the Social Sciences (Sp) Logical structure and the method of science. Basic elements of research design; observation, measurement, analytic method, interpretation, verification, presentation of results. Applications to research in economic or sociological problems of agriculture and human environmental sciences. Prerequisite: graduate standing. (Same as AGEC 5013,HESC 5463,RSOC 5463)

AGED5473 Interpreting Social Data in Agriculture (Fa) The development of competencies in analyzing, interpreting and reporting the results of analyses of social science data in agriculturally related professions. Students will select appropriate analysis techniques and procedures for various problems, analyze data, and interpret and report the results of statistical analyses in narrative and tabular form. Prerequisite: AGST 4023 (or EDFD 5393) and AGED 5463 (or RSOC 5463 or HESC 5463).

AGED550V College Teaching in Agriculture and Related Disciplines (Irregular) (1-3) For students who are pursuing graduate degrees where emphasis is on preparation for a research career, but who also may desire or expect to teach. Provides theory and practice in planning and executing a college-level course.

AGED575V Internship in Agricultural Education (Sp, Su, Fa) (1-6) Scheduled practical field experiences under supervision of a professional practitioner in off-campus secondary school systems. Emphasis includes classroom preparation, teaching, and student evaluation.

AGED600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

Extension Education (EXED)

EXED4173 Principles of Extension Teaching (Irregular) An understanding of the principles of teaching and learning, selection, and use of teaching methods and materials with emphasis on the role of extension as a part of the community education system. Prerequisite: EXED 3023 and PSYC 2003.

EXED4183 Management of Volunteer Programs (Sp) Recruiting, training, management, evaluation, and recognition of volunteers in agricultural-related agencies, non-profit organizations, community groups, and advisory committees. Prerequisite: junior standing.

EXED5113 Program Development and Evaluation (Irregular) Principles and proceedings of program development process including planning, designing, implementing, and evaluating of extension education programs. An emphasis on the framework for applying adult and non-formal education principles to the change process. Prerequisite: EXED 3023.

EXED5133 Extension Organization and Administration (Irregular) Program and personnel administration for planning and management of county extension programs. Emphasis will be given to organization, structures, principles, and theories of administration, personnel management, training and evaluation. Prerequisite: graduate standing.

Agricultural Mechanization (AGME)

AGME400V Special Problems (Sp, Su, Fa) (1-6) Individual research or study in electrification, irrigation, farm power, machinery, or buildings. Prerequisite: senior standing. May be repeated for 99 hours.

AGME402V Special Topics in Agricultural Mechanization (Irregular) (1-4) Topics not covered in other courses or a more intensive study of special topics in agricultural mechanization. May be repeated for 99 hours.

AGME4203 Mechanized Systems Management (Sp, Su, Fa) Selection, sizing, and operating principles of agricultural machinery systems, including power sources. Cost analysis and computer techniques applied to planning and management of mechanized systems. Corequisite: Lab component. Prerequisite: Lab component. Prerequisite: Math 1203.

AGME4973 Irrigation (Odd years, Sp) Methods of applying supplemental water to soils to supply moisture essential for plant growth, sources of water, measurement of irrigation water, pumps, conveyance structure, economics, and irrigation for special crops. Lecture 2 hours, laboratory 3 hours per week. Pre or Corequisite: Lab component. Prerequisite: Math 1203.

AGRICULTURAL ECONOMICS AND AGRIBUSINESS (AEAB), DEPARTMENT OF

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- University Professor LaFerney
- Professors Cochran, Dixon, Goodwin, Popp (M.), Redfern, Wailes
- Adjunct Professors Bryant, Doekson, Millager, Miller, Robinson
- Associate Professors Ahrendsen, McKenzie, Parsch, Popp (J.), Rainey, Thomsen
- Assistant Professors Hogan, Watkins
- Adjunct Assistant Professor Settlage
- Instructor Hipp

Degree Conferred:

M.S. in Agricultural Economics (AGEC)

Areas of Concentration: agricultural economics, agribusiness, international agribusiness.

Primary Areas of Faculty Research: Agribusiness, agricultural cooperatives, agricultural finance, agricultural marketing, agricultural outlook, agricultural policy, agricultural production, applied econometrics, delta crops (rice, soybeans, wheat, cotton), economic development, farm management, food policy, food marketing, global marketing, integrated pest management, international trade, managerial economics, market infrastructure and development, natural resource management, product development, production economics, public finance, risk management.

Requirements for the Master of Science Degree in Agricultural Economics (Thesis): (Minimum 31 hours.)

Prerequisites to the Thesis Concentration: Six semester hours of mathematics (College Algebra and Survey of Calculus or above); 3 semester hours of statistics; 6 semester hours of upper level (junior or senior) micro and macro economic theory; 3 semester hours of farm management or junior or senior level equivalent; 3 semester hours of agricultural marketing or junior or senior level equivalent; 6 semester hours of humanities and/or social sciences.

Core Requirements (15 hours):
- AGEC 5303 Agricultural Marketing Theory
- AGEC 5403 Quantitative Methods for Agribusiness
- AGEC/ECON 5613 Econometrics I
- ECON 5233 Mathematics for Economic Analysis
- ECON 5533 Microeconomic Theory I, or ECON 6233 Microeconomic Theory II

Elective Areas (9 hours):
- AGEC 5011 Seminar (1 hour)
- AGEC 600V Master's Thesis (6 hours)

Other Requirements:
- A minimum of 19 hours of Agricultural Economics.

Requirements for the Master of Science Degree in Agricultural Economics (Agribusiness Concentration, Non-thesis): (Minimum 31 hours.)

Prerequisites to the Non-thesis Concentration: Six semester

hours of mathematics (College Algebra and Survey of Calculus or Finite Mathematics or above); 3 semester hours of statistics; 6 semester hours of lower division economic theory (micro & macro); 3 semester hours of farm management or junior or senior level equivalent; 3 semester hours of agricultural marketing or junior or senior level equivalent; 3 semester hours of introductory accounting.

Methods, Management, Finance, Trade, Policy, and Marketing: (19 hours)

AGEC 5403 Quantitative Methods for Agribusiness
AGEC 5413 Agribusiness Strategy
AGEC 5143 Financial Management in Agriculture, or
AGEC 4143 Agricultural Finance
AGEC 5153 Economics of Public Policy, or
AGEC 4613 Domestic and International Agricultural Policy
AGEC 5303 Agricultural Marketing Theory, or
AGEC 4303 Adv. Agricultural Marketing Management, or
AGEC 4313 Agricultural Business Management
AGEC 5113 Agricultural Marketing Analysis, or
AGEC 4113 Agricultural Prices and Forecasting
AGEC 5011 Seminar

Business Electives (6 hours): Students must take 6 hours of graduate credit courses from the Walton College of Business. These courses are determined by the student with the advice and approval of her/his advisor.

Controlled Electives (6 hours):

AGEC 503V Internship in Agricultural Economics (1-3 hours)
Other Agricultural Economics Graduate Courses
Graduate Courses from the Walton College of Business
Graduate Courses from the Bumpers College of Agricultural, Food and Life Sciences

Other Requirements:
Maximum of 9 hours at the 4000 level
Minimum of 16 hours in Agricultural Economics

All agricultural economics graduate students are required to attend AGEC 5011, Seminar, for each semester they are in residence. Each student will register for AGEC 5011 the last semester in attendance.

Requirements for the Master of Science Degree in Agricultural Economics (International Agribusiness Concentration, Non-thesis): (Minimum 31 hours.)

Note: Participation in this program includes Scottish Agricultural College (SAC), University of Ghent, and University of Arkansas (UA) students. Under SAC options 1 & 2, students study during the fall semester at the UA campus and during the spring semester at SAC-Aberdeen. Under the Ghent option, students may study either semester at the UA campus and the other semester at the University of Ghent. The summer is spent completing an agribusiness internship or special problem, but enrollment remains at the host institution. UA students earn credits in AGEC 502 (V) Special Topics for courses taken at SAC or Ghent.

Prerequisites to the Non-thesis Concentration: Six semester hours of mathematics (College Algebra and Survey of Calculus or Finite Mathematics or above); 3 semester hours of statistics; 6 semester hours of lower division economic theory (micro & macro); 3 semester hours of farm management or junior or senior level equivalent; 3 semester hours of agricultural marketing or junior or senior level equivalent; and 3 semester hours of introductory accounting.

Methods, Management, Finance, Trade, Policy, and Marketing: (19 hours)

AGEC 5403 Quantitative Methods for Agribusiness
AGEC 5413 Agribusiness Strategy
AGEC 5143 Financial Management in Agriculture, or
AGEC 4143 Agricultural Finance
AGEC 5153 Economics of Public Policy, or
AGEC 4613 Domestic and International Agricultural Policy
AGEC 5303 Agricultural Marketing Theory, or
AGEC 4303 Advanced Agricultural Marketing Management, or AGEC 4313 Agricultural Business Management
AGEC 502 (1) Special Topics: Macroeconomic Effects on Agriculture
AGEC 503 (3) Internship in Agricultural Economics, or
AGEC 500V Special Problems (This application requirement is completed during the summer session)

Agribusiness Management (SAC Option 1): (12 hours)

Note: Select either Option 1, Agribusiness Management, or Option 2, Food Processing Management. Courses are taken on the SAC-Aberdeen campus during the spring semester.

AGEC 502 (1) Mgmt Theory & Reality
AGEC 502 (3) Integrated Agricultural Business Applications
AGEC 502 (1) Diversification Case Study
AGEC 502 (2) Examined Case
AGEC 502 (2) Agribusiness Case Studies
AGEC 502 (1) Environmental Management
AGEC 502 (1) Food Ind & Ret Mgmt.
AGEC 502 (1) Banking Case Study

Food Processing Management (SAC Option 2): (12 hours)

AGEC 502 (1) Human Resource Mgmt.
AGEC 502 (2) Food Industry & Retail Management
AGEC 502 (2) Int'l Consumer Studies
AGEC 502 (1) Quality Assur. in Food Chain
AGEC 502 (2) Food Business Case Study
AGEC 502 (2) International Marketing
AGEC 502 (1) Int'l Food Bus Study Tour
AGEC 502 (1) Operations Management

Agribusiness Management (Ghent Option): (12 hours)

Equivalent of 12 semester hours from the following courses (4 courses):

AGEC 502(3), Agricultural & Food Economics
AGEC 502(3), Agricultural Sociology & Extension
AGEC 502(3), Farm Management
AGEC 502(3), Project Management
AGEC 502(3), Agricultural and Rural Policy
AGEC 502(3), Agricultural Development Project
AGEC 502(3), Human Development Economics
AGEC 502(3), Agricultural Economy of Developing Countries
AGEC 502(3), Food Management and Marketing
AGEC 502(3), Research Methods in Agricultural Economics
AGEC 502(3), Industrial Management
AGEC 502(3), Applied Agro-marketing and Consumer Behavior
AGEC 502(3), Economic and Management of Natural Resources

Other Requirements:
Maximum of 9 hours at 4000 level
Minimum of 16 hours of Agricultural Economics

Agricultural Economics (AGEC)

AGEC4113 Agricultural Prices and Forecasting (Sp) Price theory and techniques for predicting price behavior of general economy and price behavior of individual agricultural products will be analyzed. Provides practice in the application of economics and statistics to agricultural price analysis. Lecture 2 hours, laboratory 2 hours per week. Prerequisite: AGEC 1103 (or ECON 2023), AGEC 2403, (introductory statistics AGST 4023 or STAT 2303 or WCOB 1033) and MATH 2053

AGEC4143 Agricultural Finance (Fa) Methods and procedures whereby agricultural firms acquire and utilize funds required for their successful operation. Emphasis is placed upon role of finance and financial planning and consideration is given to an understanding of

financial firms serving agriculture. AGEC 2143 or WCOB 1023 is recommended Prerequisite: AGEC 1103 (or ECON 2023) and AGEC 2103 (or ECON 2013).

AGEC4163 Agricultural and Rural Development (Irregular) Examination of agricultural and rural development issues in less developed countries. Alternative agricultural production systems are compared, development theories examined, and consideration given to the planning and implementation of development programs. Prerequisite: AGEC 1103 (or ECON 2023). (Same as RSOC 5163)

AGEC4303 Advanced Agricultural Marketing Management (Irregular) Marketing concepts will be developed and applied to the global food and fiber system. The course will use both commodity and product marketing principles and economic theory to analyze varied marketing situations. Case studies will be used to demonstrate the role that demand analysis and consumer behavior play in market management. Prerequisite: AGEC 2303 and AGEC 3303.

AGEC4313 Agricultural Business Management (Fa) The planning, organizing, leading and controlling functions of management as they relate to agricultural business firms. Marketing of value-added products, budgeting, organizational structure, cost control, financial statements, capital budgeting and employee supervision and motivation. Case studies are used to teach communication and decision-making skills. Prerequisite: AGEC 2143 or equivalent, AGEC 2303 or equivalent, and senior standing is recommended.

AGEC4323 AgriBusiness Entrepreneurship (Sp) Agribusiness entrepreneurship is the process of bringing food or rural-based products and services from conceptualization to market. The course presents the opportunities, problems and constraints facing individuals and firms operating in rural or isolated markets while emphasizing the steps in conceptualization, development, marketing, and delivery-selling of agribusiness rural products. Prerequisite: AGEC 1103 or equivalent.

AGEC4373 Advanced Price Risk Management (Sp) Use of futures markets as risk shifting institutions. Students design and implement hedging and cross hedging strategies for grain farmers, country elevators, soybean crushers, poultry firms, etc. Spreadsheets and statistical techniques are used to develop optimal hedging ratios. Prerequisite: AGEC 3373.

AGEC4403 Advanced Farm Business Management (Irregular) Principles and procedures of decision making as applied to the allocation of resources in the farm business for profit maximization. Emphasis is placed on use of principles of economics and their application to the decision making process. Includes exercises on the application of principles to specific farm management problems. Prerequisite: AGEC 3403 and AGME 2903 or equivalent.

AGEC4613 Domestic and International Agricultural Policy (Fa) Agricultural and food policies studied from domestic and international perspectives. Examines public policy in terms of rationale, content, and consequences. Economic framework used to assess policies to improve competitive structure, operation, and performance of U.S. and international food and agriculture. Farm, international trade, resource, technology, food marketing, and consumer policies analyzed. Prerequisite: AGEC 1103 (or ECON 2023) and AGEC 2103 (or ECON 2013).

AGEC500V Special Problems (Sp, Su, Fa) (1-3) Individual reading and investigation of a special problem in agricultural economics not available under regular courses, under the supervision of the graduate faculty. Prerequisite: graduate standing.

AGEC5011 Seminar (Sp, Fa) Presentation and discussion of graduate student research. Formal presentations are made by all graduate students. Consideration given to research design, procedures, and presentation of results. Prerequisite: graduate standing.

AGEC502V Special Topics (Irregular) (1-3) Advanced studies of selected topics in agricultural economics not available in other courses. Prerequisite: graduate standing. May be repeated for 99 hours.

AGEC503V Internship in Agricultural Economics (Sp, Su, Fa) (1-3) On-the-job application of skills developed in the M.S. program.

AGEC5113 Agricultural Marketing Analysis (Irregular) Course prepares students for some of the more common tasks in market analysis as undertaken by professional agricultural economists in industry, government, and academic institutions. Major emphasis is on the analytical procedures and techniques required in short- and long-term outlook work; forecasting and projecting supply, demand and prices; and optimal market organization. Prerequisite: AGEC 5303.

AGEC5133 Agricultural and Environmental Resource Economics (Even Years, Sp) An economic approach to problems of evaluating private and social benefits and costs of altering the environment. Emphasis given to the interaction of individuals, institutions, and technology in problems of establishing and maintaining an acceptable level of environmental quality. Prerequisite: Minimun of 3 hours Agricultural Economics or Economics at 3000 level or higher or PhD standing. (Same as ENSC 4413)

AGEC5143 Financial Management in Agriculture (Irregular) Covers advanced topics in agricultural finance. The general focus of the course is the financial management of non-corporate firms. Covers the basic tools of financial analysis including financial arithmetic, asset evaluation under risk, and financial analysis and planning using econometric models. Such topics covered include management of current assets, capital budgeting, capital structure, and institutions involved in agricultural finance. Prerequisite: graduate standing.

AGEC5153 The Economics of Public Policy (Sp) This class wil examine the impact of public policy on agricultural and other business sectors as well as households and individuals, particular in rural areas. Emphasis will also be placed on analyzing the potential impact of future policy changes. The course will focus on the application of welfare criteria and economic analyses to the problems and policies affecting resource adjustments in agriculture and rural communities. Prerequisite: graduate standing.

AGEC5303 Agricultural Marketing Theory (Sp) Survey of the structure of agricultural product and factor markets including a critique of theoretical analyses of industry structure, conduct and performance; and a review of market structure research in agricultural industries. Prerequisite: graduate standing.

AGEC5403 Quantitative Methods for Agribusiness (Fa) Application of quantitative techniques used to support managerial decision-making and resource allocation in agricultural firms. Provides exposure to mathematical and statistical tools (regression analysis, mathematical programming, simulation) used in economic analysis in agriculture. Emphasis is placed on computer applications with conceptual linkage to economic theory. Prerequisite: graduate standing.

AGEC5413 Agribusiness Strategy (Sp) Addresses problems of strategy formulation in agribusiness emphasizing current problems and cases in agriculture. Surveys modern and classic perspectives on strategy with applications to agribusiness. Examines the development of firm level strategies within the structure and competitive environment of agricultural firms and industries. Prerequisite: graduate standing.

AGEC5613 Econometrics I (Fa) Use of economic theory and statistical methods to estimate economic models. The single equation model is examined emphasizing multicollinearity, autocorrelation, heteroskedasticity, binary variables and distributed lags and model specification. Same as ECON 5613. Prerequisite: MATH 2043 and knowledge of matrix methods, (which may be acquired as a corequisite), and (AGEC 1103 or ECON 2023) and (AGEC 2403 or AGST 4023 or STAT 2303 or WCOB 1033). (Same as ECON 5613)

AGEC5623 Econometrics II (Sp) Use of economic theory and statistical methods to estimate economic models. The treatment of measurement error and limited dependent variables and the estimation of multiple equation models and basic panel data models will be covered. Additional frontier techniques may be introduced. Same as ECON 6623. Prerequisites: AGEC 5613 (or ECON 5613).

AGEC600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

AGEC700V Doctoral Dissertation (Sp, Su, Fa) (1-6) Prerequisite: candidacy.

AGRICULTURAL EDUCATION (AGED)

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- Professors Graham, Herring, Johnson, Wardlow
- Associate Professors Arthur, Scott
- Assistant Professor Miller

Degree Conferred:

M.A.T. (AGED)

The Master of Arts in Teaching (M.A.T.) is a degree program of 33 semester hours offered in consecutive summer, fall, and spring semesters. Initial enrollment will be only in the summer semester. The M.A.T. degree is the initial teaching certification program for students at the University of Arkansas.

Areas of Concentration: The M.A.T. degree program has six areas of emphasis: agricultural education, childhood education, middle-level education, physical education, secondary education, and vocational education.

Prerequisites to Degree Program: Students will be selected up to the maximum number designated for each cohort concentration. Admission requirements for the M.A.T. degree program for initial certification are as follows:

1. Completion of an appropriate undergraduate degree program
2. Completion of the pre-education core with a minimum of "C" in all courses
3. Completion of all prerequisite courses
4. Cumulative GPA of 2.70 in all previous courses
5. Admission to Teacher Education Program
6. Admission to the Graduate School
7. Payment of internship fee

Requirements for the Master of Arts in Teaching Degree: (Minimum 33 hours.)
Required M.A.T. Core: 10 hours
CIED 5012 Measurement/Research/Statistical Concepts for Teachers
CIED 5022 Classroom Management Concepts for Teachers
CIED 5042 Reading and Writing Across the Curriculum
CIED 5052 Seminar: Multicultural Issues
ETEC 5062 Teaching and Learning with Computer Based Tech.
Remaining Required for Concentration in Agricultural Education: 23 hours
AGED 5013 Advanced Methods in Agricultural Mechanics
AGED 5031 Ethics in Agricultural and Extension Education
AGED 5053 Philosophy in Agricultural and Extension Education
AGED 5074 Program Management Practicum
AGED 575V Internship in Agricultural Education (6 hours)
3-hour technical agriculture elective
3-hour elective

AGRICULTURAL, FOOD AND LIFE SCIENCES (AFLS)

Nolan Arthur
Program Chair
205 Agriculture Building
479-575-2035

Faculty members are from all the agricultural sciences.

Degree Conferred:

M.S. (AFLS)

The Master of Science in Agricultural, Food and Life Sciences is designed to prepare practitioners of diverse backgrounds and perspectives to address complex environmental, social, community and biologically-based problems in agricultural industries, education and agencies. This program provides students desiring advanced training or a broad-based education in agricultural sciences a course of study leading to a non-thesis master's degree. The Master of Science in Agricultural, Food and Life Sciences program requires a total of 30 hours of graduate level work with a minimum of 15 semester hours in the Dale Bumpers College of Agricultural, Food and Life Sciences. The student's graduate committee will outline the total program of study, including work outside the general fields of agriculture, based upon individual needs. An applicant must meet all of the requirements for admission to the Graduate School. The program's supervisory committee provides guidelines to determine the student's eligibility to enter the program and whether any course deficiencies should be assessed. The student and the Program Chair, with approval of the Dean of the Graduate School, select a major adviser. The major adviser should be from the department in which the heaviest concentration of agricultural courses (at least nine hours) will be developed. The major adviser, in consultation with the student, will recommend additional faculty members to serve on the student's graduate committee, including one member from the program supervisory committee and one from outside of the department of major interest. Each student will complete one three-hour special problem in which a technical paper will be developed. A student cannot receive credit for more than six hours of special problems or directed study for this degree.

ANIMAL SCIENCE (ANSC)

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- University Professor Yazwinski
- Professors Brown (A.H.), Coffey, Kellogg, Lusby, Maxwell, McNew, Pennington, Roeder (R.), Rorie, Rosenkrans, Troxel
- Adjunct Professors Brown (M.A.), Chewning, Nugent
- Associate Professors Apple, Coblentz, Gunter, Jennings, Johnson, Kegley, Kreider, Pohlman
- Adjunct Associate Professors Burke, Friesen, Laurence (R.), Looper
- Assistant Professors Barham, Beck, Gadberry, Jack, Powell
- Adjunct Assistant Professor Roeder (M.)

Degrees Conferred:

M.S., Ph.D. (ANSC)

Areas of Concentration: Graduate studies in subject matter areas of genetics, nutrition, parasitology, meats and physiology may be pursued. Beef cattle, dairy cattle, swine, sheep, and laboratory animals are available for research programs in the Animal Science Department.

Primary Areas of Faculty Research: Animal nutrition; animal physiology; animal breeding (genetics); meat science (muscle biology); parasitology.

Prerequisites to Degree Programs: The student pursuing a program for a Master of Science degree must meet all general requirements of the Graduate School. In addition, the student must have completed the B.S. degree, preferably in a college or university with a major or equivalent in one of the areas of the Animal Science Department. Applicants must submit three letters of recommendation. International students must submit scores on the Graduate Record Examinations.

For acceptance into a course of study leading to the Ph.D. degree, a grade-point average of 3.00 on all previous graduate work and three letters of recommendation are required. International students must submit scores on the Graduate Record Examinations. Students accepted into the Ph.D. program without a M.S. must have a 3.20 cumulative grade-point average on all undergraduate work. The student will have a minimum of 54 hours post-baccalaureate work and 18 hours of dissertation at the end of the program.

Requirements for the Master of Science Degree: (Minimum 30 hours.) The student and adviser will prepare a program of work that may include additional undergraduate basic courses and at least 24 semester hours of studies plus the completion of a thesis and one research paper. Any deficiencies in undergraduate major requirements or prerequisites for advanced courses may be included in the student's program in addition to the 24 hours.

Requirements for the Doctor of Philosophy Degree: In addition to the general requirements of the Graduate School, the requirements will consist of a program of research, appropriate course work and seminars as specified by the student's graduate committee, as well as a dissertation and two research papers acceptable to the committee.

Animal Science (ANSC)

ANSC4263 Swine Production (Even Years, Fa) Methods in producing purebred and commercial swine with specific emphasis on the management programs needed for profitable pork production in Arkansas. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: ANSC 3123 and ANSC 3133..

ANSC4272 Sheep Production (Odd years, Sp) Purebred and commercial sheep management emphasizing the programs of major importance in lamb and wool production in Arkansas. Prerequisite: ANSC 1032 and ANSC 3143 and ANSC 3123.

ANSC4283 Horse Production (Sp) Production, use and care of horses and ponies including breeding, feeding, handling, and management. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: ANSC 1032 and ANSC 3143 and ANSC 3123.

ANSC4452 Milk Production (Sp) Principles of breeding, feeding, and management of dairy cattle will be reviewed, and course will include field trip touring dairy industry. Prerequisite: ANSC 1032 and ANSC 3143.

ANSC4482 Companion Animal Management (Fa) The study and application of principles of domestication, nutrition, reproduction, parasitology, diseases, behavior, and husbandry management to companion animals. Dogs, cats, and exotic animals will be the species of primary interest. Practical problems of care and management of these species will be solved. Prerequisite: BIOL 1543 or equivalent or consent of instructor.

ANSC4652 Stocker-Feedlot Cattle Management (Sp) Production and management systems for stocker and feed-lot cattle including practical applications of forage systems, feeding, health management and economics of production of these livestock. The course will include a tour of the stocker and feedlot industry in Arkansas, and surrounding areas. Prerequisite: ANSC 1032 and ANSC 3143 and senior standing.

ANSC500V Special Problems (Sp, Su, Fa) (1-6) Work in special problems of animal industry. May be repeated for 6 hours.

ANSC5013 Domestic Animal Energetics (Odd years, Sp) Physical, physiological and biochemical aspects of energy metabolism of domestic animals and their applications to livestock production. Lecture 3 hours per week. Prerequisite: graduate standing.

ANSC510V Special Topics in Animal Sciences (Irregular) (1-4) Topics not covered in other courses or a more intensive study of specific topics in animal sciences. Prerequisite: graduate standing. May be repeated for 99 hours.

ANSC5123 Advanced Animal Genetics (Even years, Fa) Specialized study of animal genetics. Lecture 3 hours per week. Prerequisite: ANSC 3123. (Same as POSC 5123)

ANSC5133 Quantitative Inheritance (Odd years, Sp) Advanced study of the genetic basis of variation and the genetic control of quantitative traits in populations. Lecture 3 hours per week. Prerequisite: ANSC 3133.

ANSC5143 Biochemical Nutrition (Even years, Fa) Interrelationship of nutrition and physiological chemistry; structure and metabolism of physiological significant carbohydrates, lipids, and proteins; integration of metabolism with provision of tissue fuels; specie differences in regulatory control of tissue and whole body metabolism of nutrients. Prerequisite: CHEM 3813. (Same as POSC 5143)

ANSC5152 Protein and Amino Acid Nutrition (Even years, Sp) Students will be introduced to the basic processes of protein digestion, amino acid absorption, transport, metabolism, and utilization along with how biochemical function of proteins and their dynamic state affect nutritional status for animals and man. Prerequisite: CHEM 3813. (Same as POSC 5152)

ANSC5253 Advanced Livestock Production (Irregular) Comprehensive review of recent advances in research relative to the various phases of livestock production. Prerequisite: ANSC 4252 (or ANSC 4263) and ANSC 3133 (or ANSC 3143).

ANSC5353 Advanced Hay and Silage Production (Fa) Advanced study of the principles of good hay and silage production. The course includes a detailed review of forage nutritive value followed by an in-depth discussion of the management of wilting forage crops, silage biochemistry, ensiling characteristics of various forages, silo management, spontaneous heating in hay and silage, dry matter loss, management of stored hay, and changes in forage quality that result from poor conservation of harvested forages. (Same as CSES 5353.) Prerequisite: CSES 3113 and ANSC 3152 and ANSC 3151L. (Same as CSES 5353)

ANSC5743L Advanced Analytical Methods in Animal Sciences Laboratory (Fa) Introduction into theory and application of current advanced analytical techniques used in animal research. Two 3-hour laboratory periods per week. (Same as POSC 5743L).

ANSC5763 Protozoan Parasites of Domestic Livestock and Companion Animals (Even years, Fa) Course topics will include economically and medically important protozoan parasites of domestic livestock and companion animals, with an emphasis on their significance for animal and human health. Lecture/discussion 3 hours per week. (Same as POSC 5763). (Same as POSC 5763)

ANSC5853 Advanced Meats Technology (Even Years, Su) An intensive study of processed meats, relating the science, technology, and quality of further processed meat and poultry products. Product development, sensory and chemical analysis, microbiology, nutritional aspects, and product labeling are covered. (Same as POSC 5853). Prerequisite: POSC 4314 or ANSC 3613. (Same as POSC 5853)

ANSC5901 Seminar (Sp, Su, Fa) Critical review of the current scientific literature pertaining to the field of animal science. Oral reports. Lecture 1 hour per week. Prerequisite: senior standing.

ANSC5922 Neuroscience (Fa) Course covers cellular through neural systems, major brain functions and comparative neuroanatomy between mammals and birds. Specific topics include coverage of ion channels, membrane potentials, action potentials, synaptic integration, neurotransmitters, major brain regions of mammals and birds, sensory systems and the autonomic nervous system. Lecture 3 hours; Neuroscience Journal Club 1 hour per week (for first 8 weeks of semester). (Same as POSC 5922) Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5922)

ANSC5932 Cardiovascular Physiology of Domestic Animals (Fa) Cardiovascular physiology, including mechanisms of heart function and excitation, and blood vessel mechanisms associated with the circulatory system in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5932)

ANSC5942 Endocrine Physiology of Domestic Animals (Fa) Endocrine physiology, including mechanisms of hormone secretion, function, and regulation. Mechanisms associated with the endocrine system will be discussed for domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (or first 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5942)

ANSC5952 Respiratory Physiology of Domestic Animals (Sp) Respiratory physiology, including mechanisms of lung function and gas exchange. Mechanisms associated with the interaction of the respiratory system with other bodily systems in domestic animals and poultry will be discussed. Lecture 3 hours; drill 1 hour per week for first 8 weeks of semester. Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5952)

ANSC5962 Gastrointestinal/Digestive Physiology of Domestic Animals (Sp) Gastrointestinal and hepatic physiology, including mechanisms of digestion, absorption of nutrients with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5962)

ANSC5972 Renal Physiology (Sp) Renal physiology, including mechanisms of renal clearance with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC/ANSC 3032 and POSC/ANSC 3042. (Same as POSC 5972)

ANSC600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

ANSC6143 Minerals in Animal Nutrition (Odd years, Sp) Mineral nutrients, their sources and functions, as related to nutrition of domestic animals. Lecture 3 hours per week. Prerequisite: ANSC 3143 or POSC 4343.

ANSC6243 Ruminant Nutrition (Odd years, Fa) Anatomy and physiology of the rumen. The nutrient requirements of microbial organisms and the relation of microbial digestion in the rumen to the nutrition of cattle, sheep and other ruminants. Lecture 3 hours per week. Prerequisite: graduate standing.

ANSC6253 Forage-Ruminant Relations (Odd years, Sp) Advanced chemical, physical, and botanical characteristics of forage plants, the dynamics of grazing, intake and digestion, and techniques of measuring forage utilization and systems analysis at the plant-animal interface. Lecture 3 hours per week. (Same as CSES 6253). Prerequisite: ANSC 3143 and CSES 3113. (Same as CSES 6253)

ANSC6343 Vitamin Nutrition in Domestic Animals (Even years, Sp) The vitamins required by domestic animals with emphasis upon their role in animal nutrition, physiological functions, and consequences of failure to meet the requirement of the animal. Lecture 3 hours per week. Prerequisite: ANSC 3143 (or POSC 4343) and CHEM 3813. (Same as POSC 6343)

ANSC6833 Reproduction in Domestic Animals (Even years, Sp) Comprehensive review of current theory of reproductive function in domestic animals. Lecture 3 hours per week. Prerequisite: ANSC 3433.

ANSC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.

ANTHROPOLOGY (ANTH)

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- University Professor Limp
- Professors House (UAPB), Kay, Kvamme, Mainfort, Rose, Sabo, Schambach (SAU), Schneider, Swedenburg, Ungar
- Associate Professors D'Alisera, Early, Green, Jeter (UAM), Mitchem (Parkin Res. Station), Morrow (ASU), Plavcan, Stewart-Abernathy (ATU), Striffler
- Assistant Professors Casana, Erickson, Payne (Blytheville Res. Station), Trubitt (HSU)
- Research Assistant Professor Nolan

Degrees Conferred:

M.A., Ph.D. (ANTH)

Areas of Concentration: Archeology; biological/physical anthropology, cultural anthropology, and general anthropology.

Primary Areas of Faculty Research: The biological anthropology faculty studies the present and past nature and evolution of humans and other primates. Faculty specializations are evolutionary theory, paleoanthropology, dental analysis, bioarcheology, comparative morphometrics. The cultural anthropology program focuses on such issues as gender, class, religion, and public culture as shaped by history and migration. Faculty area specialties include North America, Latin America, the Middle East, and Africa. Training is offered in popular memory, labor studies, material culture, religion, performance studies, sociolinguistics, and popular culture. The archeology faculty is particularly strong in the U.S. Southeast, Great Plains, and the Middle East. Their research interests range from ethnohistory to lithic analysis, Quaternary environments, ground-based geophysical and satellite remote sensing, applications of geographical information systems technology, quantitative techniques, mortuary studies, historical archeology, and ecology. A major emphasis, in collaboration with the Arkansas Archeological Survey, is public archeology.

Prerequisites to Degree Program: Applicants must be admitted to the Graduate School and meet the following requirements: 1) satisfactory undergraduate preparation in anthropology, 2) three letters from persons competent to judge applicant's potential for graduate studies, 3) satisfactory GRE scores, and 4) a completed departmental application. Students who do not meet these requirements may be admitted conditionally. Students with course deficiencies may enroll concurrently in graduate courses.

Requirements for the Master of Arts Degree: (Minimum 30/36 hours, depending on option chosen.) A student may choose one of three options to satisfy the requirements for a Master of Arts degree in anthropology:

Anthropology M.A. with Thesis: (Minimum 30 hours.) A minimum of 24 semester hours of course work including distribution requirements specified by the department, six semester hours of thesis, and an oral examination conducted by the candidate's faculty committee.

Anthropology M.A. with Internship: A minimum of 30 semester hours of course work including distribution requirements specified by the department, six hours of internship, evidence of research ability, and an oral exam conducted by the candidate's faculty committee.

Anthropology M.A. without Thesis: Thirty-six semester hours including distribution requirements specified by the department and an oral examination conducted by the candidate's faculty committee.

A list of courses that meet the general distribution requirement is available from the departmental chair. A minimum of 21 graduate hours in anthropology is required in all three options.

Requirements for the Doctor of Philosophy Degree: (Minimum of 42 hours, including 18 hours of dissertation.)

Admission Requirements: Applicants are generally required to have a master's degree in anthropology (or the equivalent) and demonstrate competence in the subfields of archeology, biological anthropology, and cultural anthropology. A student who begins doctoral study with an M.A. from another university must take the courses required for the M.A. here that were not taken elsewhere, but these deficiency courses may, with the consent of the student's advisory committee, count toward the 24-hour course requirement. Applicants without a master's degree in anthropology (or its equivalent) but with exceptionally strong qualifications may be admitted directly into the Ph.D. program at the discretion of the department faculty.

Advisory Committee: During the first semester of study, all students will be assigned an advisory committee that will determine their particular programs. Students will select a subfield of specialization (archeology, biological anthropology, or cultural anthropology).

Foreign Language Requirement: Students are required to demonstrate competence in a foreign language related to their dissertation (in some cases a computer language may be substituted). Competence must be demonstrated by written or oral examination as appropriate.

Course Requirements: Students in the doctoral program are required to complete 24 semester hours of course work for graduate credit beyond the M.A. degree. This work will include four seminar courses to include at least one class in archeology, biological anthropology, and cultural anthropology. To strengthen and support an area of expertise, a student may take up to six hours of graduate course work in other departments. Subject to the approval of the student's advisor, these hours will count toward the 24-hour course requirement for the degree.

Candidacy Examinations: A student must complete Graduate School residence requirements and departmental course requirements before taking candidacy examinations. Students will notify their committees of their intention to take the examination, and their advisory committee will construct the examination questions.

The student's advisory committee, in consultation with other faculty as needed, will evaluate the written answers. The student's advisory committee chair will meet with the student and provide relevant feedback, including any weaknesses in the written examination that might need to be addressed in the oral examination.

The committee chair will then schedule an oral exam with the student's advisory committee. After the oral exam, the advisory committee will meet and make one of the following recommendations:

1. The student has demonstrated the knowledge, skills, and abilities to proceed with his/her dissertation. The student is then admitted to candidacy.
2. Remedial work is necessary. Remedial work may include taking portions of the qualifying exam again, writing another paper, taking an additional course or independent study, or other options as appropriate. Upon successful completion of this remedial work, the student will be admitted to candidacy.
3. The student is not admitted to candidacy.

The committee recommendations will be communicated in writing to the student and to the department chair, and the Graduate School will be notified in writing by the department chair when students have passed their candidacy examinations.

Proposal Defense: Upon admission to candidacy, students will select a dissertation committee with a major professor as chair to direct the research and writing. Under direction of the major professor, candidates will develop programs of reading in the general areas and research techniques pertinent to preparing their dissertations. To demonstrate competence in this preparation, the dissertation committee will conduct an oral proposal defense. This proposal defense must be taken no later than the end of the fall or spring semester after completing the written qualifying examinations.

Dissertation and Dissertation Defense: Students will demonstrate a capacity for independent research by writing an original dissertation on a topic within their subfield of specialization. Within the time limits specified by the Graduate School, students must submit a dissertation acceptable to their dissertation committee. Students' final examinations will be oral and primarily a defense of their dissertations.

Teaching Requirement: Although the Doctor of Philosophy degree is primarily a research degree, communication skills are critical to professional development. Therefore, each doctoral candidate will be required to engage in teaching activities in the department before completion of the program.

Faculty members located off-campus are available for research and individual guidance in any of these options.

Anthropology participates in the interdisciplinary Ph.D. program in Environmental Dynamics. See page 102.

Through an agreement with the Academic Common Market, residents of certain Southern states may qualify for graduate enrollment in this degree program as in-state students for fee purposes. See page 237 for details.

Anthropology (ANTH)

ANTH4033 Popular Culture (Irregular) Study of national and international varieties of popular culture, including music, dance, fashion, and the media. Emphasis will be given to both ethnographic approaches, which focus on the investigation of production and consumption of cultural forms and to cultural studies approaches, which see culture as a terrain of struggle.

ANTH4093 The Archeology of Death (Irregular) Study of the analysis and interpretation of archeological mortuary remains and sites. Key archeological and anthropological sources that have influenced major theoretical developments are reviewed.

ANTH4123 Ancient Middle East (Irregular) The archeology of the ancient Middle East with emphasis upon the interaction of ecology, technology and social structure as it pertains to domestication and urbanization.

ANTH4143 Ecological Anthropology (Irregular) Anthropological perspectives on the study of relationships among human populations and their ecosystems.

ANTH4153 Culture, History, and Political Economy (Fa) This course examines various aspects of the relationship between power and meaning, including concepts such as hegemony, resistance, and political consciousness. How do people produce and manipulate culture and history within the context of inequality and social change?

ANTH4163 Globalization: Crisis, Conflict and Capitalist Development (Sp) This course examines the relationship between capitalist development and forms of political and cultural struggle. We explore theories of capitalist development and scholarly attempts to understand local experiences within the context of broader processes of capitalist change.

ANTH4173 The Latin American City (Irregular) This course examines the social, political, and cultural aspects of the modern Latin American city from an interdisciplinary perspective. The course includes an introduction to urban studies concepts, and each semester is organized around a specific set of case studies.

ANTH4183 Global Politics of Food (Irregular) This course explores the politics of food production, processing, transportation, and consumption on a global level. (Same as PLSC 4523)

ANTH4243 Archeology of the Midsouth (Irregular) Survey of prehistoric and protohistoric cultures of the lower Mississippi Valley and adjacent regions. Prerequisite: junior standing.

ANTH4253 Peoples and Cultures of World Regions (Irregular) The anthropology (prehistory, peoples, and cultures) of a selected world region. Regional emphasis will vary but may include China, Europe, Northeast Asia, India or the Arctic. May be repeated for 12 hours. May be repeated for 12 hours.

ANTH4256 Archeological Field Session (Su) Practical field and laboratory experiences in archeological research. May be repeated for 12 hours. May be repeated for 12 hours.

ANTH4263 Identity and Culture in the U.S.-Mexico Borderlands (Irregular) An exploration of the interplay between Latino/a, Mexican, Anglo, and Native American identities and cultures along the U.S.-Mexico border. Course examines identity formation, hybridity, social tension, marginalization, race and gender, from an anthropological perspective, paying special attention to the border as theorectical construct as well as material reality.

ANTH4353 Laboratory Methods in Archeology (Irregular) Theory and practice of describing, analyzing, and reporting upon archeological materials.

ANTH4363 Museums, Material Culture, and Popular Imagination (Fa) Museums as ideological sites and thus as sites of potential contestation produce cultural and moral systems that legitimate existing social orders. This course will focus on strategies of representation and the continuous process of negotiating social and cultural hierarchies with and through objects that are displayed.

ANTH448V Individual Study of Anthropology (Sp, Su, Fa) (1-6) Reading course for advanced students with special interests in anthropology. May be repeated for 6 hours.

ANTH449V Special Problems in Museum Work (Irregular) (1-6) individual research, exhibit design and execution, or other problems of museum work.

ANTH4513 African Religions: Gods, Witches, Ancestors (Irregular) An exploration of African religions from a variety of anthropological perspectives, exploring how religious experience is perceived and interpreted by adherents, highlighting the way in which individual and group identities are constructed, maintained and contested within religious contexts. Readings reflect the vast diversity of religious life in Africa.

ANTH4523 Dental Science (Fa) Introduction to the study of the human dentition including its anatomy, morphology, growth and development, and histology.

ANTH4533 Middle East Cultures (Sp) Study of the peoples and cultures of the Middle East; ecology, ethnicity, economics, social organizations, gender, politics, religion, and patterns of social change. May be repeated for 9 hours.

ANTH4543 Geographic Information Systems (Sp) Computer assisted analysis and display of geographic resource data. Course develops the theory behind spatial data analysis techniques, and reinforces the theory with exercises that demonstrate its practical applications. Prior experience with computers and/or completion of GEOG 4523 (Computer Mapping) is useful but not a prerequisite. (Same as GEOG 4543)

ANTH4553 Introduction to Raster GIS (Fa) Theory, data structures, algorithms, and techniques behind raster-based geographical information systems. Through laboratory exercises and lectures multidisciplinary applications are examined in database creation, remotely sensed data handling, elevation models, and resource models using boolean, map algebra, and other methods. (Same as GEOG 4553). (Same as GEOG 4553)

ANTH4563 Vector GIS (Sp) Introduction to geographic information systems (GIS) applications in marketing, transportation, real estate, demographics, urban and regional planning, and related areas. Lectures focus on development of principles, paralleled by workstation-based laboratory exercises using Arc-node based software and relational data bases. (Same as GEOG 4563)

ANTH4573 Introduction to GRASS Applications in GIS (Fa) An introduction to geographic information systems (GIS) problem solving using the Geographic Resource Analysis Support System (GRASS) software. (Same as GEOG 4573)

ANTH4583 Peoples and Cultures of Sub-Saharan Africa (Fa) An exploration of the people and places of Africa from a variety of anthropological perspectives. Classic and contemporary works will be studied in order to underscore the unity and diversity of African cultures, as well as the importance African societies have played in helping us understand culture/society throughout the world.

ANTH4593 Introduction to Global Positioning Systems (Sp) Introduction to navigation, georeferencing, and digital data collection using GPS receivers, data loggers, and laser technology for natural science and resource management. Components of NavStar Global Positioning system are used in integration of digital information into various GIS platforms with emphasis on practical applications.

ANTH4603 Landscape Archaeology (FA) This course provides an introduction to the methods and theories of landscape archaeology. Topics include archaeological survey techniques, environmental and social processes recorded in the archaeological landscape, and analysis of ancient settlement and land use data to reveal changes in population, resource utilization, and environmental relationships.

ANTH4613 Primate Adaptation and Evolution (Fa) Introduction to the biology of the order of Primates. This course considers the comparative anatomy, behavioral ecology and paleontology of our nearest living relatives. Prerequisite: ANTH 1013 (or BIOL 1543 and BIOL 1541L). (Same as BIOL 4613)

ANTH4631L Archeological Prospecting & Remote Sensing Lab (Odd years, Fa) Ground-based geophysical, aerial, and other remote sensing methods are examined for detecting, mapping, and understanding archeological and other deposits. These methods include magnetometry, resistivity, conductivity, radar, aerial photography, thermography, and multispectral scanning. Requires computer skills, field trips, and use of instruments. Corequisite: ANTH 4633. Prerequisite: ANTH 4543 or GEOG 4543 or ANTH 4553 or GEOG 4553 or ANTH 4573 or GEOG 4573 or GEOL 1113 and ANTH 3023.

ANTH4633 Archelogical Prospecting & Remote Sensing (Odd years, Fa) Ground-based geophysical, aerial, and other remote sensing methods are examined for detecting, mapping, and understanding archelogical and other deposits. These methods include magnetometry, resistivity, conductivity, radar, aerial photography, thermography, and multispectral scanning. Requires computer skills, field trips, and use of instruments. Corequisite: ANTH 4631L. (Same as GEOS 4633)

ANTH4653 Advanced Raster GIS (Irregular) Advanced raster topics are examined beginning with a theoretical and methodological review of Tomlin's cartographic modeling principles. Topics vary and include Fourier methods, image processing, kriging, spatial statistics, principal components, fuzzy and regression modeling, and multi-criteria decision models. Several raster GIS programs are examined with links to statistical analysis software. Prerequisite: ANTH 4553 or GEOG 4553.

ANTH4803 Historical Archeology (Irregular) Review of the development of historical archeology and discussion of contemporary theory, methods, and substantive issues. Lab sessions on historic artifact identification and analysis.

ANTH4813 Ethnographic Approaches to the Past (Irregular) Review of the uses of ethnographic data in the reconstruction and interpretation of past cultures and cultural processes, with particular emphasis on the relationships between modern theories of culture and archeological interpretation.

ANTH4863 Quantitative Anthropology (Irregular) Introductory statistics course for anthropology students examines probability theory, nature of anthropological data, data graphics, descriptive statistics, probability distributions, test for means and variances, categorical and rank methods, ANOVA, correlation and regression. Lectures focus on theory methods, utilize anthropological data and a statistical software laboratory. (Same as GEOG 4863)

ANTH4903 Seminar in Anthropology (Irregular) Research, discussion, and projects focusing on a variety of topics. May be repeated for 12 hours. May be repeated for 12 hours.

ANTH4913 Topics of the Middle East (Sp, Su, Fa) Covers a special topic or issue. May be repeated for 9 hours.

ANTH4923 Karl Marx: Life, Work, and Legacy (Irregular) This course examines the writings of Karl Marx. Students will read and discuss his major works, including Capital, The German Ideology, and Grundrisse. In order to understand Marx's writing, students will also explore his life, times, and legacy.

ANTH500V Advanced Problems in Anthropology (Sp, Su, Fa) (1-18) Individual research at graduate level on clearly defined problems or problem areas. May be repeated for 18 hours.

ANTH5013 Research Methods in Anthropology (Irregular) Investigation of the nature of inquiry; scientific and other approaches to the perception of anthropological data; the development and use of research models; organization of observations; numerical and other methods of analyzing and interpreting data.

ANTH5023 Public Archeology (Sp) Practical problems of archeology in relation to federal and state needs, legislative requirements, contract research, public support and information need, and the job market.

ANTH5033 Settlements, Sites, and Models (Irregular) The modeling of potential archaeological resource locations within regions receives significant resources and funding from government and private sectors. The theoretical and methodological basis behind such models is examined, as are the history, controversies, key issues, individuals, and the important role of GIS technology and statistical methods. Prerequisite: ANTH 4543 or GEOG 4543 or ANTH 4553 or GEOG 4553.

ANTH5053 Quarternary Environments (Fa) An interdisciplinary study of the

Quarternary Period including dating methods, deposits, soils, climates, tectonics, and human adaptation. Lecture 2 hours, laboratory 2 hours per week. (Same as GEOG 5053,GEOL 5053)
ANTH5103 Applications of Cultural Method and Theory (Fa) Review of the nature and history of cultural anthropology; recent theories and practical implications and applications of various methods of acquiring, analyzing and interpreting cultural anthropological data.
ANTH5153 Topics in Anthropology (Sp, Su, Fa) Graduate level seminar with varied emphasis on topics relating to cultural anthropology. May be repeated for 99 hours.
ANTH5203 Applications of Archeological Method and Theory (Fa) Review of the nature and history of archeology; recent theories and practical implications and applications of various methods of acquiring, analyzing, and interpreting archeological data.
ANTH525V Topics in Archeology (Sp, Su, Fa) (1-18) Graduate level seminar with varied emphasis on topics relation to archeology. May be repeated for 99 hours.
ANTH5263 Indians of Arkansas and the South (Odd Years, Sp) Study of the traditional lifeways and prehistoric backgrounds of Indians living in the southern United States, including Arkansas.
ANTH5303 Applications of Method and Theory in Biological Anthropology (Irregular) Review of the nature and history of biological anthropology; recent theories and the practical implications and applications of various methods of acquiring, analyzing, and interpreting data.
ANTH5333 Social Organization (Fa) Comparative study of social organization focusing primarily on pre-industrial and non-western cultures. Primary topics are variation in kinship, kinship groups, kinship terminological analysis, marriage, and current developments in social structure.
ANTH535V Topics in Physical Anthropology (Sp, Fa) (1-6) Graduate level seminar with varied emphasis on topics relating to physical anthropology. May be repeated for 99 hours.
ANTH5413 Bioarcheology Seminar (Even years, Sp) Intensive coverage of bioarcheological method and theory with the context of both academic and cultural resources management research.
ANTH5423 Human Evolutionary Anatomy (Irregular) Paleobiologists reconstruct past lifeways and systematic relationships of our ancestors using comparative studies of bony morphology and associated soft tissues. This course surveys methods and theories used to infer function and phylogeny, and details relevant aspects of the anatomy of humans, living great apes, and fossil human ancestors. Prerequisite: ANTH 1013 and BIOL 1543. (Same as BIOL 5423)
ANTH5443 Cultural Resource Management I (Irregular) Concentrated discussion of management problems relative to cultural resources, including review and interpretation of relevant federal legislation, research vs. planning needs, public involvement and sponsor planning, and assessment of resources relative to scientific needs. No field training involved; discussion will deal only with administrative, legal, and scientific management problems.
ANTH546V Special Problems in Museum Work (Irregular) (1-6) Individual research, exhibit design and execution, or other problems of museum work. May be repeated for 6 hours.
ANTH561V Field Research in Archeology (Irregular) (1-6) Directed graduate level archeological fieldwork. May be repeated for 6 hours.
ANTH5633 Advanced Archaeological Prospecting (Irregular) This course offers advanced training in applications of archaeological geophysics. Emphasis is placed on theory, instrument handling, uses of advanced software, and the interpretation of data from five principal methods: magnetometry, electrical resistivity, electromagnetic induction, ground-penetrating radar, and thermal infrared imaging. Prerequisite: ANTH 4633
ANTH600V Master's Thesis (Sp, Su, Fa) (1-6)
ANTH6033 Society and Environment (SP) This course examines the complex interrelationships between human societies and the natural environment. Drawing on diverse and interdisciplinary perspectives in archaeology, ethnography, history, geography, and palaeoenvironmental studies, readings and discussion will explore the co-production of social and environmental systems over time. (Same as ENDY 6033) May be repeated.
ANTH610V Internship (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
ANTH681V Seminar: Cultural Anth (Sp, Fa) (1-6) Variable topics in Cultural Anthropology will be explored in depth. May be repeated for 6 hours.
ANTH682V Seminar: Archeology (Sp, Fa) (1-6) Variable topics in Archeology will be explored in depth.
ANTH683V Seminar: Biological Anth (Sp, Su, Fa) (1-6) Variable topics in Biological Anthropology will be explored in depth.
ANTH700V Doctoral Dissertation (Sp, Fa) (1-9)

ART (ARTS)

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- Distinguished Professor Harington
- Professor Peven
- Associate Professors Golden, Jacobs, LaPorte, Musgnug, Nelson, Newman
- Assistant Professors Hapgood, Hulen, Swartwood
- Instructor Parnell-Ward

Degree Conferred:

M.F.A. (ART)

The objective of the program of study leading to the degree of Master of Fine Arts in art shall be professional achievement of high order, a knowledge of art history and criticism, the development of a fundamental grasp and understanding of the professional field of art and its relationship to supporting fields of knowledge, as well as the satisfactory completion of course work and other degree requirements. The program of study will vary depending upon the art medium areas selected for the creative work and the goals of the individual graduate student. The Master of Fine Arts degree in art is considered to be the terminal degree in studio art and is awarded in recognition of professional development in the visual arts as evidenced by a period of successful post-bachelor's degree study. The M.F.A. degree is recognized as preparatory to studio art teaching positions at institutions of higher education.

Areas of Concentration: Major and/or minor concentrations include drawing, painting, sculpture, design, printmaking, ceramics, and photography.

Prerequisites to Degree Programs: An earned bachelor's degree with an art major concentration or its equivalent. Consideration will be given applicants without an art major concentration who present evidence of proficiency in creative work in the visual arts.

Acceptance to the M.F.A. degree program requires a two-semester art history survey or its equivalent. Failing to meet this requirement, the M.F.A. student is required to complete the appropriate semesters of survey of art history for non-graduate credit.

In addition to the requirements for admission to the Graduate School, the applicant must also submit the following materials to the Department of Art: transcripts of college level work; at least three letters of reference concerning art work, work habits, and potential for graduate study in art; a portfolio of art works; a personal statement concerning background, imaginative and technical development, and goals for graduate study in visual art; and an application form obtained from the Department of Art on request.

Requirements for the Master of Fine Arts Degree: Completion of a minimum of 60 semester credit hours and a minimum of four regular semesters in residence (not to include summer terms).

1. A minimum of 41 credit hours in studio courses:
   a. A minimum major concentration area of 4 semesters (12 credit hours).
   b. A minimum minor concentration area of 3 semesters (9 credit hours).
   c. Four semesters of ARTS 5912 Graduate Seminar in Studio Art (total of 8 credit hours).
   d. A minimum of 12 additional credit hours. These may include additional credits in the major concentration, minor concentration, and 3 credit hours in excess of the required 9 hours of Art History and/or criticism. Up to 6 credit hours in graduate courses taken outside the art department may be included, with prior approval.
2. Art History requirement: While in the M.F.A. program, the student is required to complete a minimum of nine hours of art history as follows:
   a. An elected 19th or 20th century art history course. (ARHS

4813, ARHS 4883, ARHS 4893, ARHS 4913, or ARHS 4923)
b. An elected pre-19th century art history course. (ARHS 4833, ARHS 4843, ARHS 4853, ARHS 4863, or ARHS 4873)
c. ARHS 6943, Seminar: Critical Thought in the Arts

3. Graduate Critique (4 semester hours)
a. M.F.A. students will have regular group critiques with faculty in their major concentration areas of study. The format for these critiques will be flexible, and professional and practical problems in art will be covered.
b. All M.F.A. students will have regular reviews with the art faculty to critique works in progress. Required participation in these reviews will be by registration in ARTS 5901, Graduate Critique, for four semesters. The first three semesters will require participation with the full groups of M.F.A. students and art faculty. The fourth semester will be the individual graduate student and the graduate committee; or, a group of M.F.A. candidates preparing to complete the degree, thesis or exhibition requirement. Graduate students not working toward the M.F.A. degree are encouraged to participate in critiques, but they are not required to register for credit.

4. The required final semester in the M.F.A. program is to be devoted to work on M.F.A. Exhibition, ARTS 601V (6 credit hours), the production and presentation, under the direction of a graduate committee, of a one-person exhibition of art work. The M.F.A. candidate will be responsible for making three acceptable slide (or digital presentation) sets of the exhibition and exhibition statements, which will be retained by the Department of Art and the University Library.

The final semester must be completed during a regular school year. During this final semester, the M.F.A. candidate may enroll for three additional credit hours in electives if the candidate does not hold a graduate assistantship. The M.F.A. candidate holding an assistantship may not take additional credits in the final semester.

In addition to the requirements listed above, the M.F.A. program in Art also requires:

Candidacy Application and Review: After completion of at least two semesters in the M.F.A. degree program, the student may make application to be a candidate for completion of the M.F.A. degree. The art faculty will conduct a formal review of the applicant's work and progress in the program. At least two regular semesters of residence must be completed after acceptance as a degree candidate.

Graduate Committee and Major Adviser: When the student has been accepted as a degree candidate, the student will select a major adviser from the graduate art faculty. The major adviser will serve as adviser to the student in planning the completion of the program of study. At least one semester before graduation, a four- or five-member committee of graduate art faculty will be selected. The student's major adviser will be chairperson of this committee, and one member of the graduate committee will represent the art history or criticism area. The degree candidate may select one additional committee member from a discipline outside the Department of Art.

Art History (ARHS)

ARHS4813 The History of Photography (Irregular) Survey of photography from 1685 to present.
ARHS4823 History of Graphic Design (Irregular) Survey of graphic design history from 1850 to the present. Prerequisite: ARHS 2923.
ARHS4833 Ancient Art (Even years, Sp) Study of the visual arts of Mesopotamia, Egypt, Greece, and The Roman Empire. Prerequisite: ARHS 2913.
ARHS4843H Honors Medieval Art (Irregular) Study of Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic styles. Prerequisite: ARHS 2913. (Same as ARHS 4843)
ARHS4843 Medieval Art (Irregular) Study of Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic styles. Prerequisite: ARHS 2913. (Same as ARHS 4843H)
ARHS4853 Italian Renaissance Art (Irregular) Study of Proto-Renaissance, Early, High Renaissance, and Mannerist styles in Italy. Prerequisite: ARHS 2923.
ARHS4863H Honors Northern Renaissance Art (Irregular) Study of Late Gothic and Renaissance styles in the Netherlands, Germany, and France. Prerequisite: ARHS 2923. (Same as ARHS 4863)
ARHS4863 Northern Renaissance Art (Irregular) Study of Late Gothic and Renaissance styles in the Netherlands, Germany, and France. Prerequisite: ARHS 2923. (Same as ARHS 4863H)
ARHS4873H Honors Baroque Art (Irregular) Study of art styles of the 17th and 18 centuries, primarily in Italy, Spain, France, Flanders, and the Netherlands. Prerequisite: ARHS 2923. (Same as ARHS 4873)
ARHS4873 Baroque Art (Irregular) Study of art styles of the 17th and 18 centuries, primarily in Italy, Spain, France, Flanders, and the Netherlands. Prerequisite: ARHS 2923. (Same as ARHS 4873H)
ARHS4883H Honors 19th Century European Art (Even Years, Fa) Study of Neo-Classical, Romanticist, Realist, Impressionist, and Post-Impressionist styles. Prerequisite: ARHS 2923. (Same as ARHS 4883)
ARHS4883 19th Century European Art (Even Years, Fa) Study of Neo-Classical, Romanticist, Realist, Impressionist, and Post-Impressionist styles. Prerequisite: ARHS 2923. (Same as ARHS 4883H)
ARHS4893H 20 Century European Art (Odd Years, Sp) Study of the major styles and movements of the century, including Cubism, Fauvism, German Expressionism, and Surrealism. Prerequisite: ARHS 2923.
ARHS4893 20th Century European Art (Odd Years, Sp) Study of the major styles and movements of the century, including Cubism, Fauvism, German Expressionism, and Surrealism. Prerequisite: ARHS 2923.
ARHS4913H Honors American Art to 1900 (Odd Years, Fa) The visual arts in the United States from their beginning in Colonial times through the nineteenth century. Prerequisite: ARHS 2923. (Same as ARHS 4913)
ARHS4913 American Art to 1900 (Odd Years, Fa) The visual arts in the United States from their beginning in Colonial times through the nineteenth century. Prerequisite: ARHS 2923. (Same as ARHS 4913H)
ARHS4923H HONORS AMERICAN ART SINCE 1900 (Even Years, Sp) The visual arts in the United States from the turn of the century to the contemporary era. Prerequisite: ARHS 2923. (Same as ARHS 4923)
ARHS4923 American Art Since 1900 (Even Years, Sp) The visual arts in the United States from the turn of the century to the contemporary era. Prerequisite: ARHS 2923. (Same as ARHS 4923H)
ARHS4973 Seminar in Art History (Irregular) Special studies of periods and styles of art. Prerequisite: 6 hours of art history.
ARHS4983 Special Topics in Art History (Irregular) Subject matter not covered in regularly offered courses, and relating to the history of art before the nineteenth century. May be repeated (for different topics) for up to 6 hours. Prerequisite: ARHS 2913 or ARHS 2923. May be repeated for 6 hours.
ARHS6933 Graduate Research In Art History (Sp) Independent study in specific areas of art history and criticism.
ARHS6943 Seminar: Critical Thought in Art (Fa) Explore topics of concern to the studio artist involving underlying concepts and purposes of art as well as models and methods for the analysis of art. Course based on discussions of selected readings, prepared papers and seminar reports. Prerequisite: graduate standing. May be repeated for 3 hours.

Art (ARTS)

ARTS4023 Figure Drawing II (Irregular) Advanced study of the figure with emphasis on figure structure and its relationship to pictorial form in drawing. Prerequisite: ARTS 2013.
ARTS4363 Graphic Design Typography (Irregular) Studies include type as form, typographic contrast principles, legibility, text organization and hierarchy, and experimental approaches to typographic design. Overview of typographic history is included. Current computer software applications utilized. Prerequisite: ARTS 3363.
ARTS4373 Graphic Design: Symbols (Irregular) Emphasis on the development of logos, pictograms, symbols, and conceptual symbolism, with a study of the history of symbol generation. Current computer software applications utilized. Prerequisite: ARTS 3363.
ARTS4383 Graphic Design: Layout (Irregular) Advanced explorations of organizational principles and design processes applied to print media. Contemporary design practices and graphic design history are studied. Current computer software applications utilized. Prerequisite: ARTS 3363.
ARTS4613 Visual Design: Web I (Fa) This course introduces students to the World Wide Web and the technologies and practices involved in creating a successful Web presence. Discussions include interactivity, usability and accessibility with an emphasis on handcoding standards-based XHTML and cascading style sheets and a special attention to graphic design standards. Prerequisite: Arts 3363.
ARTS4623 Visual Design: Web II (Sp) This course will study advanced techiques in creating successful Web sites, including information architecture, SHTML and cascading style sheets, Web animation, digital photography, sequential storytelling and actual client work. Experimentation inconcept, style and format are encouraged as students scrutinize the limitations and potential of design for the World Wide Web. Prerequisite: ARTS 4613
ARTS4653 Elements of Animation (Sp) This course explores the fundamentals of sequential imaging and storytelling from traditional methods through modern animation software. computer based projects will make use of digital and video cameras, video editing software, Web animation software and a 3D animation package. Prerequisites: ARTS 1013, and ARTS 1313 and ARTS 3363.
ARTS469V Special Problems In Interactive Design (Sp, Fa) (1-6) Students work on special projects on an individual basis with instructor, exploring innovative interface design, in-depth projects potentially exploring solutions to and awareness of social issues, with

various types of media, from DVD and digital video to Web and motion graphics. Cross-discipline collaboration is encouraged. may be repeated for a total of 6 hours. Prerequisites: ARTS 4613 and ARTS 4623 and ARTS 4653. May be repeated for 6 hours.

ARTS4813 Digital Photography (Fa, Even years) Introduction to digital photography production, techniques and theory. Digital input from scanning (flatbed & slide/negative), digital cameras, video and Internet sources. Computer assisted manipulation of imagery for correction and abstraction. Output to a digital printing systems, analog systems (film recorder), servers and Internet. Prerequisite: ARTS 3803.

ARTS4833 Advanced Photography (Fa) Individual problems in photography with optional study in areas of color, slide production, and photography application to other art media. Prerequisite: ARTS 3803.

ARTS484V Special Problems in Photography (Sp, Fa) (1-6) Individual instruction for advanced undergraduates and graduate students. Special projects in photography designated by students in collaboration with faculty. Prerequisite: ARTS 3803 and (ARTS 3813 or ARTS 4823 or ARTS 4833). May be repeated for 6 hours.

ARTS4921 Workshop: Professional Practices in Art (Sp) A workshop in professional artistic practices including portfolio presentation, matting, framing, writing resumes, making slides of work, health and safety issues, opportunities, etc. Prerequisite: Art majors only. Requires junior, senior or graduate standing.

ARTS493V Fine Arts Gallery Internship (Sp, Su, Fa) (1-3) Study all aspects of operating the Fine Arts Gallery. Research and preparation for exhibitions, organize and install exhibits, care of art works, create and distribute publicity, arrange interviews with newspapers, and other media.

ARTS494V Graphic Design Internship (Sp, Su, Fa) (1-6) Credit for practical experience gained through internship in graphic design. Report required form intern and field supervisor on progress and significant accomplishments. 3 credit hours per semester. Prerequisite: Any 4000 level ARTS visual design course except ARTS 4343. May be repeated for 6 hours.

ARTS5013 Graduate Drawing (Fa) Graduate level study of drawing materials and techniques. Prerequisite: graduate standing.

ARTS5901 Graduate Critique (Sp, Su, Fa) Art faculty review and critique of M.F.A. student's art works. Prerequisite: admission into the M.F.A. program.

ARTS5912 Graduate Seminar in Studio Art (Sp, Fa) Examination and analysis of current issues in contemporary visual art. The relationship of current theoretical literature to studio practice will be explored through presentations and discussions of graduate student research. Prerequisite: admission to MFA program.

ARTS601V Master of Fine Arts Exhibition (Sp, Su, Fa) (1-6) Production and presentation of a one person exhibition of art work. The M.F.A. candidate will be responsible for making three acceptable slide sets of the exhibition and exhibition statements. Prerequisite: M.F.A. candidacy.

ARTS602V Graduate Drawing (Sp, Su, Fa) (1-6) Individual problems in drawing techniques. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS612V Graduate Painting (Sp, Su, Fa) (1-6) Individual problems in painting techniques. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS622V Graduate Sculpture (Sp, Su, Fa) (1-6) Individual problems in sculpture techniques. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS632V Graduate Design (Sp, Su, Fa) (1-6) Individual problems in two and three dimensional design. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS642V Graduate Printmaking (Sp, Su, Fa) (1-6) Individual problems in printmaking techniques. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS652V Graduate Ceramics (Sp, Su, Fa) (1-6) Individual problems in ceramic techniques. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS682V Graduate Photography (Sp, Su, Fa) (1-6) Individual problems in photography. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS692V Special Studio Problems (Sp, Su, Fa) (1-6) Individual problems in studio areas on arranged basis. Prerequisite: graduate standing. May be repeated for 99 hours.

ARTS695V Special Topics (Irregular) (1-6) Subject matter not covered in other courses. Prerequisite: graduate standing. May be repeated for 12 hours.

ARTS AND SCIENCES (ARSC)

Charles H. Adams
Associate Dean, Fulbright College
525 Old Main
479-575-4801

The following course may be enrolled in by students in certain special circumstances when approved for studies in off-campus programs. The consent of the Associate Dean of Fulbright College is required.

Arts and Sciences (ARSC)

ARSC500V Study Abroad (Sp, Su, Fa) (1-6) Open to graduate students studying abroad in officially sanctioned programs. May be repeated for 24 hours.

ASIAN STUDIES (AIST)

Charles H. Adams
Acting Chair of Studies
525 Old Main
479-575-4801

Asian Studies (AIST)

AIST4313 Language and Society of Japan (Fa) The primary objective of this course is to investigate the way the Japanese language reflects the beliefs and customs of the Japanese people as a social group. For comparison purposes, this course makes reference to studies in American language and culture. Proficiency in Japanese not required. Prerequisite: junior standing. (Same as COMM 4313,SOCI 4313) May be repeated for 6 hours.

BIOLOGICAL AND AGRICULTURAL ENGINEERING (BAEG), DEPARTMENT OF

Lalit R. Verma
Department Head
203 Engineering Hall
479-575-2351
E-mail: baeg@engr.uark.edu

Web: http://www.baeg..uark.edu/
http://www.baeg.uark.edu/BME

Biological & Agricultural Engineering Faculty:
- Professors Gardisser, Griffis, Li, Loewer, VanDevender, Verma
- Associate Professors Carrier, Chaubey, Costello, Haggard, Kim, Matlock, Tacker
- Assistant Professors Bajwa, Kavdia, Osborn, Ye
- Adjunct Professors Ang, Clausen, Deaton, Ingles
- Adjunct Associate Professors Beitle, Yang
- Adjunct Assistant Professors Howell, Shafirstein, Wimberly

Biomedical Engineering Faculty:
- Distinguished Professor Varadan (V.K.)
- Professors Li, Verma
- Associate Professors Carrier, Matlock
- Assistant Professors Bajwa, Kavdia, Kim, Osborn, Ye
- Adjunct Professors Ang, Clausen, Deaton, Ingles
- Adjunct Associate Professors Beitle, Yang
- Adjunct Assistant Professor Shafirsein

Supporting Biomedical Engineering Faculty:
- University Professor Schmitt
- Professors Durdik, Fritsch, Malshe
- Associate Professors Barlow, Couvillion, El-Shenawee, Selvam, Tung
- Assistant Professors Heymsfield, Teo, Tian
- Research Assistant Professor Burgers

Degrees Conferred:
M.S.B.E. (BENG) in Biological Engineering
M.S.B.M.E. (BMEN) in Biomedical Engineering
M.S.En.E. (ENEG) in Environmental Engineering, in collaboration with Civil Engineering (See Environmental Engineering)
M.S.E. (BENG) in Engineering (See Engineering)
Ph.D. (BENG) in Engineering (See Engineering)

Biological Engineering (BENG)

Primary Areas of Faculty Research:

Biomedical engineering -- nanomedicine, tissue engineering, organ regeneration and its clinical application, bioinstrumentation, biosensing/medical imaging, medical electronics, physiological modeling, biomechanics, and rehabilitation engineering.

Biotechnology Engineering -- biotechnology at the micro and nano scale, food processing, food safety and security, developing

new products from biomaterials, and biotransformation to synthesize industrial and pharmaceutical products.

Ecological Engineering -- Integrates ecological principles into the design of sustainable systems to treat, remediate, and prevent pollution to the environment. Applications include mathematical modeling of watershed process, stream restoration, watershed management, water and wastewater treatment design, ecological services management, urban greenway design and enclosed ecosystem design.

Requirements for the Master of Science Degree: (Minimum 30 hours) In addition to the requirements of the Graduate School and the graduate faculty in Engineering, the following departmental requirements must be satisfied for the M.S.B.E. degree:

1. Candidates are required to complete not less than 24 semester hours of course work acceptable to the committee and a minimum of six semester hours of thesis.
2. The minimum acceptable grade on a graduate course is "C."
3. Prior to acceptance into the program a candidate must, in consultation with the department head, identify a professor who is willing to serve as the major professor. During the first semester, the candidate must, in consultation with the major professor and department head, select a graduate committee. The candidate will, in consultation with the committee, prepare a written graduate program of study that will achieve the candidate's objectives.
4. Candidates must prepare a paper suitable for submission to a refereed journal from research done for a thesis or BENG 500V.

Biomedical Engineering (BMEN)

The Master of Science in Biomedical Engineering is a multidisciplinary degree program designed for students from a multitude of academic areas. Regardless of undergraduate discipline, each candidate for the degree must complete a number of basic undergraduate engineering courses. In general, graduates of engineering programs will have completed most, if not all, of these courses and can expect to be accepted with little or no undergraduate prerequisite requirements. However, the prerequisite requirements for graduates of programs other than engineering can be quite significant.

Program Objectives: The objectives of the M.S.B.M.E. program are to prepare graduates for careers in biomedical engineering practice with government agencies, engineering firms, or industries and to provide a foundation for continued study at the post-masters level.

Primary Areas of Faculty Research: Bioimaging and Biosensing; Bioinformatics and Computational Biology; Tissue Engineering and Biomaterials; Bio-MEMS/Nanotechnology.

Admission Criteria: The following are the minimum criteria for admission to the M.S.B.M.E. degree program:

GPA: 3.00 or higher on the last 60 hours of the baccalaureate degree

TOEFL: 213 or higher

GRE Scores: The minimum to be considered for admission is 1000 (Quantitative + Verbal).

Degree Requirements: All M.S.B.M.E. degree candidates, regardless of previous degree status, must demonstrate completion of the Basic Engineering Education and Biomedical Engineering Breadth requirements listed below. Candidates who do not possess a degree from a program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) must also satisfy the basic level ABET accreditation requirements. These include completion of no less than 48 credit hours of approved engineering topics and demonstrating, to the satisfaction of the student's graduate study committee, that he/she possesses those abilities and characteristics required of graduates from ABET accredited engineering programs. This shall include the completion of a course that concentrates on a major design project and that results in the production of a design report or other design product as appropriate. The design project must build on and require engineering knowledge and skills from previous course work and must incorporate engineering standards and realistic constraints. The course selected to satisfy this requirement is subject to the approval of the student's graduate study committee. Exceptions to these degree requirements may be requested by means of a petition outlining the reasons for the exceptions and presenting an alternate plan for completing the program. The petition shall be subject to the approval of the student's graduate study committee and the Program Director and Department Head. Credit for courses taken at another institution is subject to the approval of the Program Director and Department Head. In particular, advanced engineering courses (3000, 4000, and 5000-level at the University of Arkansas) normally will not be accepted for transfer from institutions or degree programs that are not accredited by ABET.

I. Basic Engineering Education Requirements

General Education Recommended Courses	Credit Hours
Humanities/social science	15
Acceptable to undergraduate program	
English composition	6
ENGL 1013 and 1023	
Mathematics and Basic Science Recommended Courses	
Calculus & differential equations	16
MATH 2554, MATH 2564, MATH 2574, & MATH 3404	
General Chemistry	4
CHEM 1123 & 1121L	
University Physics (calculus based)	4
PHYS 2054 & PHYS 2050L	
Microbiology	4
BIOL 2013 & BIOL 2011L	
Organic Chemistry	4
CHEM 3603 and CHEM 3601L	
Biochemistry	3
CHEM 3803	
Human Anatomy	4
BIOL 2443 & BIOL2441L	
Human Physiology	4
BIOL 2213 & BIOL 2211L	
Cell Biology	4
BIOL 2533 & BIOL 2531L	
Basic Engineering Topics Recommended Courses	
Statics	3
MEEG 2003	
Mechanics of Materials	3
MEEG 3103	
Fluid Mechanics 3	3
CHEG 2133 or MEEG 3503	
Circuits	3
ELEG 2103 & ELEG 2101L	
Electronics	3
BENG 4103	
Thermodynamics	3
MEEG 2403 or CHEG 2313	

II. Biomedical Engineering Breadth Requirements (18 hours)

Required Topics Recommended Courses	
Biomedical Engineering Principles	3
BENG 4203	
Tissue and Cell Engineering	3

BENG 5233	
Introduction to Bioinformatics	3
BENG 5213	
Bio-MEMS	3
BENG 5253	
Mathematical Modeling of Physiological Systems	3
BENG 5203	
Transport Phenomena	3
BENG 3733	
Mechanical Design	3
BENG 3803	
Biosensors and Bioinstrumentation	3
BENG 4123	
Biological Reactor Systems Design	3
BENG 4623	
Instrumentation	3
BENG 4103	
Properties of Biological Materials	3
BENG 3712	

Topics	
Biomedical Control Systems	3
Reaction Kinetics	3
Signal/Image Processing	3
Control Systems/Theory	3
Biomedical Engineering Physiology	3
Engineering Statistics/Probability	3
Biomechanics	3

III. Biomedical Engineering Specialization (M.S.BME. graduate program)

Thesis Option: 30 hours of graduate-level course work including 16 hours of core courses as identified below, plus 8 hours of courses from one of the specialty areas identified below, plus 6 hours of research resulting in a written Master's Thesis.

Non-Thesis Option: 33 hours of graduate-level course work including 16 hours of core courses as identified below, plus 14 hours from one of the specialty areas identified below, plus 3 hours of independent study resulting in a written Master's Report.

Core Courses:

- BENG 5203 Mathematical Modeling of Physiological Systems
- BENG 5801 Graduate Seminar
- BENG 5103 Advanced Instrumentation in Biological Engineering
- BENG 5703 Design and Analysis of Experiments for Eng, Research or
- BENG 5223 Biomedical Engineering Research Internship
- 6 hours of Advanced Science Courses chosen from the list below

Advanced Science Courses:

- CHEM 5813
- CHEM 5843
- CHEM 6873
- CHEM 6883
- BIOL 5263
- BIOL 5334
- BIOL 5423
- MBIO 5343
- ZOOL 5514
- ZOOL 5544
- KINS 5323
- KINS 5333
- KINS 5513
- KINS 5523
- KINS 5543
- KINS 6323
- KINS 6343
- PHYS 5123
- PHYS 5133

Specialty Areas and Approved Courses: Students are expected to select the required hours of graduate courses from one of the four following specialty areas and listing of approved courses. Other courses will be considered on petition to the student's graduate study committee and the Director and Department Head.

Bioimaging and Biosensing:

Recommended Courses

- BENG 4123 Biosensors and Bioinstrumentation
- CENG/ELEG 5683 Image Processing

Elective Courses (one elective and two advanced science courses may come from the following)

- ELEG 4603 Digital Signal Processing Systems
- ELEG 5673 Pattern Recognition
- INEG 4533 Applications of Machine vision
- CHEM 4213 Instrumental Analysis
- CHEM 5223 Chemical Instrumentation
- CHEM 5243 Electrochemcial Methods of Analysis
- CHEM 5253 Spectrochemical Methods of Analysis
- ANAT 5203 Neurophysiology Recording Techniques (UAMS)
- PHYO 5063 Molecular Biophysics (UAMS)
- PHYO 510V Radiation Biology (UAMS)

Bioinformatics and Computational Biology:

Recommended Courses

- BENG/CSCE 5213 Introduction to Bioinformatics
- CENG 5003/CSCE 5043 Artificial Intelligence

Elective Courses (one elective and two advanced science courses may come from the following)

- CSCE 5123 Databased Management Systems
- BIOL 5263 Cell Physiology/BIOL 5261L(Lab)
- BIOL 5334 Biochemical Genetics
- CHEM 5813 Biochemistry I
- CHEM 5843 Biochemistry II
- MATH 4153 Mathematical Modeling
- ANAT/MBIM/PATH/PHYO 5114 Gene Expression (UAMS)
- BIOC 5103 Biochemistry and Molecular Biology (UAMS)
- MBIM 5904 Genetics and Pathogenesis (UAMS)
- PATH 5043 Molecular and Biochemical Pathology (UAMS)
- PHYO 5063 Molecular Biophysics (UAMS)

Tissue Engineering and Biomaterials:

Recommended Courses

- BENG 5233 Tissue and Cell Engineering
- BENG 5243 Biomaterials

Elective Courses (one elective and two advanced science courses may come from the following)

- BENG 4113 Risk Analysis for Biological Engineering
- CHEG 5013 Membrane Separation and System Design
- CHEG 5513 Biochemical Engineering Fundamentals
- MEEG 5303 Physical Metallurgy
- MEEG 5393 Engineering Materials Topics
- CHEM 5813 Biochemistry I
- CHEM 5843 Biochemistry II
- MBIO 4714 Basic Immunology/MBIO 4710L (Lab)
- MBIO 5343 Advanced Immunology

KINS 5323 Biomechanics I
KINS 6323 Biomechanics II
ANAT 5026 Microscopic Anatomy (UAMS)
ANAT/MBIM/PATH/PHYO 5114 Gene Expression (UAMS)
PCOL 5033 General Principles of Pharmacology and Toxicology (UAMS)
PCOL 5063 Toxicology for Graduate Students (UAMS)
PHSC 5033 Pharmaceutics for Graduate Students (UAMS)
PHSC 517V Advanced Biopharmaceutics and Pharmacokinetics (UAMS)
PHYO 5063 Molecular Biophysics (UAMS)
PHYO 510V Radiation Biology (UAMS)

Bio-MEMS and Nano-Biotechnology:

Recommended Courses
BENG 5253 Bio-MEMS
MEPH 5713 Advanced Nanomaterials Chemistry

Elective Courses (one elective and two advanced science courses may come from the following)
MEEG 591V Nanomanufacturing: Materials and Processes
MEPH 5723 Science of Nanostructures
BIOL 5334 Biochemical Genetics
CHEM 5813 Biochemistry I
CHEM 5843 Biochemistry II
CHEM 6873 Molecular Biochemistry
PHYO 5063 Molecular Biophysics (UAMS)

At least 18 of the 30+ credit hours presented for the M.S.BME. must be 5000-level or higher, and the cumulative grade-point average on all graduate courses presented for the degree must be at least 3.00. The cumulative grade-point average on the basic engineering education and biomedical engineering breadth courses must be at least 2.70.

Candidates for the degree must pass a comprehensive final examination that will include either a defense of the candidate's thesis or a presentation and discussion of the candidate's Master's Report. The examination is to be prepared and administered by the student's graduate adviser.

Biological Engineering (BENG)

BENG4103 Instrumentation in Biological Engineering (Sp) Theory and advanced applications of analog circuits, digital circuits, and commercial instruments involving biological materials. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BENG 2103 or ELEG 2103. (Same as BENG 4103H)

BENG4113 Risk Analysis for Biological Systems (Odd years, Fa) Principles of risk assessment including exposure assessment, dose response, and risk management. Methods of risk analysis modeling and simulation with computer software. Applications of risk analysis in medical, animal, food and environmental systems. Prerequisite: MATH 2564 and BIOL 2013.

BENG4123 Biosensors & Bioinstrumentation (Odd years, Sp) Principles of biologically based sensing elements and interfacing techniques. Design and analysis methods of biosensing and transducing components in bioinstrumentation. Applications of biosensors and bioinstrumentation in bioprocessing, bioenvironmental, biomechanical and biomedical engineering. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2013 and BENG 4103.

BENG4403 Design of Enclosed Ecosystems (Irregular) Environmental and functional design of buildings, chambers, rooms and habitats to house/exhibit animals and plants. Advanced analytical techniques which incorporate physiological considerations. Psychometrics, solar and alternate energy principles. Design of ventilation, heating and cooling systems and controls. Design considerations include animal behavior, stress and welfare. Lecture 2 hours, lab 3 hours per week. Corequisite: Lab component. Prerequisite: BENG 2622.

BENG452V Special Topics in Biological Engineering (Irregular) (1-6) Special topics in biological engineering not covered in other courses. May be repeated. May be repeated for 8 hours.

BENG4623 Biological Reactor Systems Design (Fa) Extension of principles of microbial growth kinetics and transport phenomena to the design of biological reactor systems used in biological engineering. Reactor systems using specialty microbial biomass (activated sludge) for substrate utilization as well as biomass and product formation. Application areas such as bio-remediation, bioprocessing and organic (food/animal) waste treatment.Corequisite: Lab component. Prerequisite: MATH 3404. Pre- or Corequisite: BENG 3733

BENG4803 Precision Agriculture (Odd years, Fa) Introduction to precision agriculture, benefits, spatial variability within a field, zone concept, and site-specific management. Spatial data collection: sensors, GPS, yield monitoring, and remote sensing. Knowledge discovery from data: data processing, neural networks, genetic algorithms, and use of GIS. Decision support systems. Variable-rate technology: real-time and map-based systems, variable-rate machinery, and smart controls. Evaluation: Yield mapping and economic analysis. Students are expected to have basic computer skills and statistics knowledge. (same as CSES 4803). Corequisite: Lab component. Prerequisite: MATH 1213 and junior standing.

BENG4813 Senior Biological Engineering Design I (Fa) Design concepts for equipment and processes used in biological, food and agricultural industries. Initiation of comprehensive two-semester team-design projects; defining design objectives, developing functional/mechanical criteria, standards, reliability, safety, ethics and professionalism issues. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: consent of instructor. Prerequisite: BENG 3723. Pre-or Corequisite: BENG 3733.

BENG4822 Senior Biological Engineering Design II (Sp) Continuation of BENG 4813. Design concepts for equipment and processes used in biological and agricultural industries. Completion of 2-semester team design projects. Construction, testing, and evaluation of prototypes. Written and oral design reports. Discussion of manufacturing methods, safety, ergonomics, analysis/synthesis/design methods as appropriate for particular design projects. Laboratory/design 4 hours per week. Prerequisite: BENG 4813.

BENG500V Advanced Topics in Biological Engineering (Irregular) (1-6) Special problems in fundamental and applied research. Prerequisite: graduate standing. May be repeated for 6 hours.

BENG5103 Advanced Instrumentation in Biological Engineering (Even years, Sp) Applications of advanced instrumentation in biological systems. Emphasis on updated sensing and transducing technologies, data acquisition and analytical instruments. Lecture 2 hours, lab 3 hours per week. Corequisite: Lab component. Prerequisite: BENG 4103.

BENG5113 DIGITALRemote Sensing and GIS (Irregular) Basic digital image processing techniques and geo-spatial analysis applied to monitoring of natural processes and resources. Course topics include introduction to electromagnetic radiation, concept of color, remote sensing systems, and light attenuation by atmosphere, objects and sensors. Advanced topics include data models, spectral transforms, spatial transforms, correction and calibration, geo-rectification, and image classification with hyperspectral and multi-spectral images acquired with aerial and satellite sensors. Raster GIS is integrated into course throughout the semester. Will use software such as ENVI, ArcGIS and ArcView. Requires a class project in the student's area of interest. Lecture 2 hours, lab 3 hours per week. Students may not earn credit for both BENG 5113 and BENG 4133. Corequisite: Lab component. Prerequisite: MATH 3404.

BENG5123 Imaging and Rapid Analysis of Biological and Agricultural Materials (Irregular) Techniques of imaging and non-invasive analyses of biological and agricultural materials. Covering spectral sensing (x-ray, UV, VS, IR), optics, image processing, recognition, on-line monitoring and vision-based controls. Applications to automated food/fruit inspections, defect/contaminant detection, and characterization of food non-food materials in real-time on processing lines. Prerequisite: BENG 4103.

BENG5203 Mathematical Modeling of Physiological Systems (Sp) Application of mathematical techniques to physiological systems. The emphasis will be on cellular physiology and cardiovascular system. Cellular physiology topics include models of cellular metabolism, membrane dynamics, membrane potential, excitability, wave propagation and cellular function regulation. Cardiovascular system topics include models of blood cells, oxygen transport, cardiac output, cardiac regulation, and circulation. Background in biology and physiology highly recommended. Lecture 3 hours per week. Prerequisite: MATH 3404.

BENG5213 Introduction to Bioinformatics (Odd years, Sp) Application of algorithmic techniques to the analysis and solution of biological problems. Topics include an introduction to molecular biology and recombinant DNA technology, biological sequence comparison, and phylogenetics, as well as topics of current interest. (Same as CSCE 5213)

BENG5223 Biomedical Engineering Research Internship (Sp, Su, Fa) Minimum six-week program (possibly up to several months) in a medical research environment working on an original engineering research project. Possible specialty areas include Anaesthesiology, Cardiology, Informatics, Opthalmology, Orthopedic Surgery, and Radiology. Prerequisite: graduate standing and approval of co-ordinator.

BENG5233 Tissue and Cell Engineering (Fa) This course introduces students to biological, engineering and clinical aspects of tissue and cell engineering. The introduction to stem cells and histology are reinforced with a concomitant lab that introduces cell culture techniques and illustrates functional and structural aspects of various biological tissues. Topics include Cell Signalling, Transport and Kinetics, Scaffolds, Surface Interactions, Drug Delivery, and Clinical, Ethical and Regulatory Considerations. Two to three lecture hours per week plus three lab hours per week. Corequisite: lab component. Prerequisite: MATH 3404 and CHEM 3813.

BENG5243 Biomaterials (Sp) a graduate course on molecular structure-property relationships in biomaterials. Special focus is given to polymers, metals, ceraics, composites, and biodegradable materials. The design of artificial biomaterials for biosensors, drug delivery and medical implants is considered. Host response and biocompatibility fctors are introduced. Previous course in materials desirable.

BENG5253 Bio-Mems (IR) Topics include the fundamental principoles of microfluidics, Navier-Stokes Equation, bio/abio interfacing technology, bio/abio hybrid integration of microfabrication technology, and various biomedical and biological problems that can be addressed with microfabrication technology and the engineering challenges associated with it. Lecture 3 hour per week. Prerequisites: MEEG 3503 or CVEG 3213 or CHEG 2133. (Same as MEEG 5253)

BENG5263 Biomedical Engineering Principles (Fa) Engineering principles applied to the design and analysis of systems affecting human health. This is a course focusing on fundamentals of physiological systems and modeling. Topics include: brief overview of anatomy and physiology, bioelectric phenomena and neuronal model, compartmental modeling, cardiovascular system and blood flow, biomechanics, computational biology and signal transduction. Requires a background in circuits, fluid dynamics, mechanics, biology, and/or biochemistry. Lecture 3 hours per week. Students may not earn credit for both BENG 5263

and BENG 4203. Prerequisites: MATH 3404 or equivalent and graduate standing. May be repeated.

BENG5613 Simulation Modeling of Biological Systems (Irregular) Application of computer modeling and simulation of discrete-event and continuous-time systems to solve biological and agricultural engineering problems. Philosophy and ethics of representing complex processes in simplified form. Deterministic and stochastic modeling of complex systems, algorithm development, application limits, and simulation interpretation. Emphasis on calibration, validation and testing of biological systems models for the purposes of system optimization, resource allocation, real-time control and/or conceptual understanding. Prerequisite: AGST 4023 or STAT 4003 or INEG 3333.

BENG5703 Design and Analysis of Experiments for Engineering Research (Irregular) Principles of planning and design of experiments for engineering research. Propagation of experimental error. Improving precision of experiments. Analysis of experimental data for optimal design and control of engineering systems using computer techniques. Students must have an introductory background in statistics. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component.

BENG5713 Food Product and Process Development (Odd years, Fa) Multidisciplinary approaches for developing new food products and processes in the context of an industry-sponsored project. Group dynamics and interpersonal skills. Factors that influence product and process development. Analysis and modeling applied to food process design. Lecture 1 hour, laboratory 6 hours per week. Corequisite: Lab component. Prerequisite: BENG 4703.

BENG5723 Food Safety Engineering (Even years, Fa) Principles of engineering methods applied to food and safety and sanitation. Principles of engineering methods applied to food safety and security. Discussion of thermal, chemical and electrical pasteurization or sterilization in food processing. Demonstration of monitoring and detecting techniques for food safety, including image analysis, biosensors and modeling. Lecture 3 hours per week. Prerequisite: BENG 4103 and FDSC 4124 (or equivalent).

BENG5733 Advanced Biotechnology Engineering (Odd Years, Fa) Applications of the principles of bioprocess/biochemical engineering to microbiological and biomedical problems. Topics include applied enzymology, metabolic engineering, molecular genetics and control, and bioinformatics and nanobiotechnology in addition to classical applied enzyme and cell-growth kinetics and advanced bioreactor design. Prerequisite: BENG 3733 or CHEG 5531.

BENG5743 Biotechnology Engineering (Sp) Introduction to biotechnology topics ranging from molecular biological engineering, bioprocess engineering, biopharmaceutical manufacturing and biosensors to FDA regulations, as well as engineering principles in the design of the systems in the aforementioned topic areas. Requires background in microbiology, organic chemistry and thermodynamics. Lecture 3 hour per week. Students may not earn credit for both BENG 5743 and BENG 4703

BENG5801 Graduate Seminar (Sp) Reports presented by graduate students on topics dealing with current research in agricultural engineering. Prerequisite: graduate standing.

BENG5903 Water Quality Modeling and Management (Irregular) Processes and methodologies associated with surface water quality modeling, investigation of management processes based on modeling results. Process from simple steady-state spreadsheet models (to understand aquatic biosystems modeling) to complex GIS-based dynamic models. Develop calibration and validation statistics for model applications. Students will develop a semester project that integrates their skills and knowledge in parameterizing, calibrating, and validating water quality models for environmental applications. Prerequisite: BENG 5613.

BENG5913 Bioremediation and Biodegradation (Irregular) Environmentally-relevant biotechnology using organisms to remove or metabolize environmental pollutants through microbial degradation and phytoremediation of recalcitrant compounds. Benefits as well as potential costs of environmental applications of biotechnology will be evaluated.

BENG5923 Nonpoint Source Pollution Control and Modeling (Fa) Control of hydrologic, meteorologic, and land use factors on nonpoint source (NPS) pollution in urban and agricultural watersheds. Discussion of water quality models to develop NPS pollution control plans and total maximum daily loads (TMDLs), with consideration of model calibration, validation, and uncertainty analysis. Prerequisite: BENG 4903 or CVEG 3223.

BENG5933 Environmental and Ecological Risk Assessment (Sp) Process and methodologies associated with human-environmental and ecological risk assessments. Environmental risk assessments based on human receptors as endpoints, addressing predominantly abiotic processes. Ecological risk assessments based on non-human receptors as endpoints. Approach using hazard definition, effects assessment, risk estimation, and risk management. Application of methods to student projects to gain experience in defining and quantifying uncertainty associated with human perturbation, management and restoration of environmental and ecological processes.

BENG5943 Ecological Engineering Principles (Sp) Engineering principles involved in assessment and management of ecosystems. Includes frequency analysis of rainfall, infiltration, runoff, and evapotranspiration. Use of GIS/mathematical models to quantify extent of ecological pollution. Design/implementation of best management practices and discussion of Total Maximum Daily Load (TMDL) principles and processes. Lecture 3 hours per week. Students may not earn credit for both BENG 5943 and BENG 4903. Prerequisites: CVEG or equivalent.

BENG5953 Ecological Engineering Design (Fa) Design of low impact development techniques to enhance ecological services, reduce peak runoff, and capture sediments, nutrients and other pollutants resulting from urban development. Techniques may include: bio-swales, retention basins, filter strips. Design of sustainable ecological processes for the treatment and utilization of wastes/residues. Techniques may include: direct land application to soils/crops, composting systems, lagoons and constructed wetlands. Design goals include optimization of ecological services to maintain designated uses of land, water and air; including enhancement of habitat for wildlife and recreation, and the discovery of economically viable methods for co-existence of urban and agricultural land uses. Lecture 3 hours per week. Students may not earn credit for both BENG 5953 and BENG 4923. Prerequisite: BENG 4903 or equivalent. May be repeated.

BENG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

BENG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

BIOLOGICAL SCIENCES (BISC)

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- University Professor James
- Professors Beaupre, Durdik, Etges, Gentry, Henry, Rhoads, Smith, Spiegel, Walker
- Research Professors Krementz, Stephenson
- Associate Professors Brown, Ivey, Kral, Lehmann, McNabb, Pinto, Sagers, Ziegler
- Associate Research Professor Magoulick
- Assistant Professors Curtin, Huxel, Silberman
- Assistant Research Professor Goforth

Degrees Conferred:

M.A., M.S., Ph.D. in Biology (BIOL)

The graduate programs in Biological Sciences offer opportunity for advanced study and research to students who desire a comprehensive view of biological sciences. Accomplishment is judged by competence and a developing sense of responsibility for the advancement of knowledge rather than the fulfillment of routine requirements. The faculty requires of all candidates for advanced degrees a period of study in residence, advanced competence in the chosen area of expertise, satisfactory introduction to allied subjects, the ability to communicate at a scholarly level, and a satisfactory performance in examinations. A concentration in Space and Planetary Sciences is available for those in the Ph.D. program.

Primary Areas of Faculty Research: Cell and molecular biology (biotechnology, cellular physiology, functional genomics, gene regulation, immunology, developmental biology, molecular genetics, pathogenic microbiology); ecology and evolutionary biology (animal behavior, aquatic ecology, animal and plant physiology, conservation biology, community ecology, exobiology, fisheries biology, limnology, molecular systematics, mycology, physiological ecology, plant morphology, population and quantitative genetics, taxonomy, vertebrate biology – herpetology, ichthyology, mammalogy, ornithology – and wildlife management).

Admission to Degree Program: Applicants who wish to study for advanced degrees are expected to present a minimum of 18 hours of biological science. These normally will include training in the three areas of the Biology Subject test of the Graduate Record Examinations: a) cellular and molecular biology, b) organism biology, and c) ecology, evolution, and population biology. Applicants lacking experience in any of the above areas will be expected to broaden their biological training and may be assigned specific course work to fulfill this requirement. Students lacking a total of 18 hours of biological sciences may be admitted on a conditional basis and are not eligible for assistantships. All students applying for admission to the graduate program must provide scores on the verbal, quantitative, and analytical writing sections of the Graduate Record Examinations. Those scores, along with transcripts and three letters of recommendation, will be

used in evaluating applications of students applying for assistantships.

All students must have a major professor to enter the graduate program in biological sciences. Ultimately each candidate will have a committee composed of members of the graduate faculty and the student's major professor. Students must also fulfill the Graduate School's residency requirements, which are stated elsewhere in this catalog.

All students are required to earn credit in two graduate seminars. Additional seminar requirements may be specified by the major professor in conjunction with the graduate committee. Students are required to present a research seminar prior to the oral thesis or dissertation defense.

Requirements for the Master's Degree: Two degree programs are available, both of which require 30 semester hours of graduate credit specified by the department. The Master of Science includes at least 24 semester hours of course credit and thesis research. Master of Science students are required to enroll in BIOL 600V for 6 hours of credit and to submit a scholarly thesis based on field and/or laboratory research. Master of Arts students must enroll in BIOL 600V for 6 hours of credit and submit a scholarly thesis based on critical evaluation of scientific literature (on a topic agreed upon by their advisory committee), and complete at least 24 hours of graduate courses. A specific coursework program will be selected under the guidance of the student's major professor and graduate committee. An oral comprehensive examination is required of all candidates, including a defense of the thesis, which in the case of M.S. students will follow their research seminar.

Specific Requirements for the Doctor of Philosophy Degree: There are no formal course requirements for doctoral students, except the two seminars mentioned previously. A minimum of 18 hours must be taken in dissertation credit. Students wishing to bypass the master's degree must complete 24 hours of post-baccalaureate graduate coursework before they can be considered for the doctoral program. The Ph.D. is granted not only for fulfillment of technical requirements, but also for development and possession of a critical and creative ability in science and fruitful expression of imagination. Evidence of this is given in the dissertation that the candidate prepares, which constitutes an original research contribution to the fields of the biological sciences.

The Graduate School requires two examinations of all students pursuing the Doctor of Philosophy degree. These examinations are designed to assist students in developing the ability to communicate at a scholarly level and to show they have attained intellectual mastery of knowledge relating to the biological sciences. The Candidacy Examination contains both written and oral portions related to the student's field of interest and is taken after approximately two years of graduate study. Successful completion of that examination means that the student becomes a candidate for the degree of Doctor of Philosophy; failure of that examination means that the student cannot be readmitted to the graduate program in the Department of Biological Sciences. The oral Final Examination, preceded by a research seminar, is primarily concerned with the candidate's dissertation and is taken at the end of the candidate's program.

Biology (BIOL)

BIOL4003 Laboratory Techniques in Microbiology (Fa) Provides experience with laboratory techniques in microbial physiology, metabolism, and genetics. Laboratory 6 hours per week. Prerequisite: BIOL 2013 and BIOL 2011L and CHEM 3603 and CHEM 3601L and CHEM 3613 and CHEM 3611L.

BIOL4124 Food Microbiology (Sp) (Formerly MBIO 4124) Microbiology, contamination, preservation, and spoilage of different kinds of foods, food poisoning, sanitation, control, and inspection; microbiology of water; and standard methods for official food and public health laboratories. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2533 and CHEM 1123 and CHEM 1121L or equivalent. (Same as FDSC 4124)

BIOL4233 Microbial Genetics (Fa) Principles of molecular genetics in microorganisms, including the concepts of DNA structure and function, mutation, transformation, conjugation, transduction, recombination, and genetic engineering. Prerequisite: BIOL 2013 and BIOL 2011L and BIOL 2323 and CHEM 3603 and CHEM 3601L and CHEM 3613 and CHEM 3611L.

BIOL4234 Comparative Physiology (Fa) Comparison of fundamental physiological mechanisms in various animal groups. Adaptations to environmental factors at both the organismal and cellular levels are emphasized. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2533 and CHEM 3613 and CHEM 3611L

BIOL4304 Plant Physiology (Fa) Study of plant processes. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 1613 and BIOL 1611L and BIOL 1543 and BIOL 1541L and general chemistry.

BIOL4313 Physiology of Microorganisms (Fa) Life processes of microorganisms. Prerequisite: BIOL 2533 and CHEM 3603 and CHEM 3601L and CHEM 3613 and CHEM 3611L.

BIOL4353 Ecological Genetics (Odd years, Fa) Analysis of the genetics of natural and laboratory populations with emphasis on the ecological bases of evolutionary change. Prerequisite: BIOL 2323 and BIOL 2321L and MATH 2554 and STAT 2023 or equivalent.

BIOL4424 Mycology (Fa) Form and function of the fungi. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: BIOL 1613 and BIOL 1611L and BIOL 1543 and BIOL 1541L.

BIOL4443 Molecular Virology (Odd years, Sp) Presents the molecular mechanisms underlying viral life-cycles; tropism and host cell recognition, penetration, genome replication, gene expression, transformation, assembly, nucleic acid packaging, and egress. Emphasis placed on experimental approaches. Lecture 3 hours per week. Prerequisite: (BIOL 4233 or BIOL 2323) and (BIOL 4753 or BIOL 2533) or graduate standing.

BIOL4613 Primate Adaptation and Evolution (Sp, Su, Fa) Introduction to the biology of the order Primates. This course considers the comparative anatomy, behavioral ecology and paleontology of our nearest living relatives. Prerequisite: BIOL 3023 or ANTH 1013. (Same as ANTH 4613)

BIOL4703H Honors Mechanisms of Pathogenesis (FA) A survey of the events causing human disease at the molecular, cellular and genetic levels. Seeks to develop an appreciation that both the tricks pathogens use and the body's own defenses contribute to pathology. Prerequisite: BIOL 2533.

BIOL4703 Mechanisms of Pathogenesis (Fa) A survey of the events causing human disease at the molecular, cellular and genetic levels. Seeks to develop an appreciation that both the tricks pathogens use and the body's own defenses contribute to pathology. Prerequisite: BIOL 2533.

BIOL4711L Basic Immunology Laboratory (Sp) Corequisite: BIOL 4713.

BIOL4713H Honors Basic Immunology (SP) A general overview of Immunity with emphasis on the underlying cellular, molecular, and genetic events, and discussions of more specialized issues in Immunology, such as disease states involving the Immune system, and other interesting problems in modern Immunology. Prerequisite: BIOL 2323 and BIOL 2533.

BIOL4713 Basic Immunology (Sp) (Formerly MBIO 4714) A general overview of immunity with emphasis on the underlying cellular, molecular, and genetic events, and discussions of more specialized issues in immunology, such as disease states involving the immune system, and other interesting problems in modern immunology. Lecture 2 hours, laboratory 4 hours per week. Prerequisite: BIOL 2323 and BIOL 2533.

BIOL4724 Protistology (Odd years, Fa) The biology of eukaryotes other than Animals, Land Plants, and Fungi with emphasis on morphology and modern approaches to phylogenetic systematics. Three hours lecture, four hours lab/week. Involves writing term papers. Corequisite: Lab component. Prerequisite or Corequisite: BIOL 3023 or graduate standing. Prerequisite: BIOL 2533 and BIOL 2323 or graduate standing.

BIOL4753 General Virology (Sp) An introduction to viral life-cycles, structure, and host cell interactions. Emphasis placed on molecular and biochemical aspects of virology. Two hour lecture and one hour discussion. Prerequisite: BIOL2533 and BIOL2323 (Same as ANSC 4753)

BIOL4793 Introduction to Neurobiology (SP) Exploration of the neurological underpinnings of perception, action, and experience including: how sense receptors convert information in the world into electricity, how information flows through the nervous systems, how neural wiring makes vision possible, how the nervous system changes with experience, and how the system develops. Prerequisite: BIOL 2533 May be repeated.

BIOL480VH Honors Special Problems (Sp, Su, Fa) (1-6) For advanced students with adequate preparation. (Same as BIOL 480V) May be repeated for 99 hours.

BIOL480V Special Problems (Sp, Su, Fa) (1-6) For advanced students with adequate preparation. (Same as BIOL 480VH) May be repeated for 99 hours.

BIOL485V Field Ecology (Sp, Su) (1-3) Project oriented approach employing current field and laboratory techniques, experimental design, and data analysis. Field trip is required.

BIOL490V Special Topics in Microbiology (Irregular) (1-6) Consideration of new areas of microbiological knowledge not yet treated adequately in textbooks or in other courses. Prerequisite: 8 hours of biological sciences. May be repeated for 6 hours.

BIOL4933 Special Topics in Zoology (Su) Discussion of recent outstanding zoological research of interest to zoology majors and public school science teachers. May be repeated with different instructor of a maximum of 6 hours of credit. Prerequisite: 8 hours of biological sciences. May be repeated for 6 hours.

BIOL5001 Seminar in Biology (Sp, Fa) Discussion of selected topics and review of current literature in any area of the biological sciences. May be repeated for 2 hours.

BIOL5101 Bibliographic Practicum (Fa) Systematic survey of biological resources available on CD-ROM, through electronic library on-line services, and on the Internet and World Wide Web. Prerequisite: senior or graduate standing.

BIOL5261L Cell Physiology Laboratory (Sp) Laboratory demonstrations of cell processes involved in growth, metabolism, transport, excitation, signalling and motility. Laboratory 3 hours. Pre- or Corequisite: BIOL 5263.

BIOL5263 Cell Physiology (Sp) Covers cellular processes involved in growth, metabolism, transport, excitation, signalling and motility, with emphasis on function and regulation in eukaryotes, primarily animals. Lecture 3 hours. Prerequisite: BIOL 2533 and BIOL 2531L and CHEM 3813 and PHYS 2033.

BIOL5264 Soil Microbiology (Odd years, Fa) A study of the microorganisms in soil and the biochemical processes for which they are responsible. Lecture 3 hours, laboratory 3 hours per week. Corequisite: lab component. Prerequisite: BIOL 2013 and BIOL 2011L.
BIOL529V Research in Physiology (Sp, Su, Fa) (1-6)
BIOL5323 Plant Growth and Growth Substances (Even years, Sp) Concepts and techniques employed in the study of growth and development with emphasis on growth substances. Prerequisite: BIOL 4304 and organic chemistry.
BIOL5334 Biochemical Genetics (Sp) Lectures and laboratories based on modern molecular genetic techniques for analyses of eukaryotes and manipulation of prokaryotes. A hands-on course in recombinant DNA techniques: laboratory practices in gene identification, cloning, and characterization. Lecture 2 hours, laboratory 6 hours per week. Corequisite: Lab component. Prerequisite: BIOL 3323 (or equivalent) and CHEM 3813 (or equivalent).
BIOL5343 Advanced Immunology (Fa) Aspects of innate, cell-mediated, and humoral immunity in mammalian and avian species. Molecular mechanisms underlying the function of the immune system are emphasized. A course in Basic Immunology prior to enrollment in Advanced Immunology is recommended but not required. Lecture 3 hours per week. (Same as POSC 5343)
BIOL5352L Immunology in the Laboratory (Sp) Laboratory course on immune-diagnostic laboratory techniques and uses of antibodies as a research tool. Included are cell isolation and characterization procedures, immunochemistry, flow cytometry, ELISA and cell culture assay systems. Laboratory 6 hours per week. Prerequisite: POSC 5343 or BIOL 5343. (Same as POSC 5352L,VTSC 5352L)
BIOL5353 Ecological Genetics (Odd years, Fa) Analysis of the genetics of natural and laboratory populations with emphasis on the ecological bases of evolutional change. Prerequisite: BIOL 3323 and BIOL 3321L and MATH 2554 and STAT 2023 or equivalent.
BIOL539V Research in Genetics (Sp, Su, Fa) (1-6)
BIOL5423 Human Evolutionary Anatomy (Irregular) Paleobiologists reconstruct past lifeways and systematic relationships of our ancestors using comparative studies of bony morphology and associated soft tissues. This course surveys methods and theories used to infer function and phylogeny, and details relevant aspects of the anatomy of humans, living great apes, and fossil human ancestors. Prerequisite: ANTH 1013 and BIOL 1543. (Same as ANTH 5423)
BIOL5433 Principles of Evolution (Even years, Fa) Advanced survey of the mechanisms of evolutionary change with special emphasis on advances since the Modern Synthesis. Historical, theoretical, and population genetics approaches are discussed. Recommended: BIOL 3023 and BIOL 3321L and BIOL 3861L. Prerequisite: BIOL 3323 and BIOL 3863.
BIOL5463 Physiological Ecology of Animals (Odd years, Sp) Interactions between environment, physiology, and properties of individuals and populations on both evolutionary and ecological scales. Prerequisite: BIOL 3863 and BIOL 4234.
BIOL549V Research in Vertebrate Morphology (Sp, Su, Fa) (1-6)
BIOL5503 Ecosystem Ecology (Odd years, Sp) Factors controlling ecosystem structure and function. Topics include paleoclimate and species migrations, current species alliances, biogeochemical cycles, and climate change and ecosystem stability. Prerequisite: BIOL 3864.
BIOL5511L Population Ecology Laboratory (Sp) Demonstration of the models and concepts from BIOL 5513. Pre- or Corequisite: BIOL 5513.
BIOL5513 Population Ecology (Sp) Survey of theoretical and applied aspects of populations processes stressing models of growth, interspecific interactions, and adaptation to physical and biotic environments. Corequisite: BIOL 5511L. Prerequisite: BIOL 3864.
BIOL5523 Physiological Ecology (Even years, Sp) Effects of environmental factors on plant growth. Studies of light, temperature, soil, and soil moisture relationships will be emphasized. Prerequisite: BIOL 3864.
BIOL5524 Developmental Biology (Sp) An analysis of the concepts and mechanisms of development emphasizing the experimental approach. Corequisite: Lab component.
BIOL5533 Chemical and Biochemical Aspects of Evolution (Odd years, Sp) Abiotic synthesis of biomolecules on Earth, the origin of cells; genetic information, origin of life on Earth and elsewhere, evolution and diversity, ecological niches, bacteria, archaea, eukaryotes, novel metabolic reshaping of the environment, life being reshaped by the environment, molecular data and evolution.
BIOL5544 Comparative Vertebrate Embryology (Fa) Comparative study of the embryology of selected vertebrate types through the mammal with special emphasis on humans. Lecture 2, laboratory 6 hours per week. Corequisite: Lab component.
BIOL558V Research In Cell Biology (Fa, Sp, Su) (1-18) May be repeated for 18 hours.
BIOL559V Research in Embryology (Sp, Su, Fa) (1-6)
BIOL5643 Invertebrate Phylogeny (Even years, Sp) Introduction to the principles and practice of phylogeny reconstruction and rigorous evaluation of animal relationships inferred from molecular and morphological characters. Emphasis will be on high-level phylogeny of invertebrate taxa. Prerequisite: BIOL 2814 or equivalent.
BIOL569V Research in Invertebrate Zoology (Sp, Su, Fa) (1-6)
BIOL5723 Fish Biology (Odd years, Sp) Morphology, classification, life histories, population dynamics, and natural history of fishes and fish-like vertebrates. Lecture 2 hours, laboratory 3 hours per week. Corequisite: lab component. Prerequisite: 12 hours of biological sciences.
BIOL5743 Herpetology (Even years, Sp) Morphology, classification and ecology of amphibians and reptiles. Lecture 2 hours, laboratory 1 hour per week. Corequisite: lab component.
BIOL5763 Ornithology (Even years, Sp) Taxonomy, morphology, physiology, behavior, and ecology of birds. Lecture, laboratory, and field work. Corequisite: lab component. Prerequisite: 10 hours of biological sciences.
BIOL5783 Mammalogy (Fa) Lectures and laboratory dealing with classification, morphology, distribution, ecology, behavior, and physiology of mammals. Two hours lecture, 4 hours laboratory. Corequisite: Lab component.
BIOL579V Research in Vertebrate Zoology (Sp, Su, Fa) (1-6)
BIOL580V Research in Botany (Sp, Su, Fa) (1-6) May be repeated for 6 hours.
BIOL5814 Limnology (Odd years, Fa) Physical, chemical and biological conditions of inland waters. Lecture 3 hours per week, laboratory arranged. Corequisite: lab component. Prerequisite: (CHEM 1123 and CHEM 1121L) or equivalent and 12 hours of biological sciences.
BIOL581V Research In Microbiology (Sp, Su, Fa) (1-6)
BIOL5822 Animal Distribution (Even years, Fa) Physical, chronological, and biological factors affecting animal distribution, emphasizing terrestrial and fresh-water vertebrates.
BIOL5833 Animal Behavior (Odd years, Fa) Organization, regulation, and phylogeny of animal behavior, emphasizing vertebrates. Lecture, laboratory, and field work. Corequisite: lab component.
BIOL5844 Community Ecology (Even years, Sp) Survey of theoretical and applied aspects of community processes stressing structure, trophic dynamics, community interactions, and major community types. Corequisite: Lab component. Prerequisite: BIOL 3864.
BIOL585V Field Ecology (Sp, Su) (1-3) Project-oriented approach employing current field and laboratory techniques, experimental design and data analysis. Field trip is required. May be repeated for 99 hours.
BIOL589V Research in Field Zoology (Sp, Su, Fa) (1-6)
BIOL590V Special Topics in Botany (Sp, Fa) (1-6) Consideration of new areas of botanical science not yet treated adequately in textbooks or in other courses. Prerequisite: 8 hours of biological sciences. May be repeated for 6 hours.
BIOL5914 Stream Ecology (Even years, Fa) Current concepts and research in lotic ecosystem dynamics. Lecture, laboratory, field work and individual research projects required. Corequisite: lab component. Prerequisite: some previous course work in ecology is essential.
BIOL591V Special Topics in Microbiology (Sp, Fa) (1-6) Consideration of new areas of microbiological science not yet treated adequately in textbooks or in other sciences. Prerequisite: 8 hours of biological sciences. May be repeated for 99 hours.
BIOL5922 Conservation of Endangered Species (Odd years, Sp) Biological, bureaucratic, and political reasons for protection of the nation's plants and animals. Conservation biology, ecology, population genetics, and legal implications of protecting selected species in ecosystem are discussed. Lecture 2 hours per week. Prerequisite: 12 hours of biological sciences.
BIOL5933 Global Biogeochemistry: Elemental Cycles and Environmental Change (Odd Years, Sp) This course explores the chemical, biological, and geological processes occurring within ecosystems. An understanding of these processes is used to investigate how they form the global biogeochemical cycles that provide energy and nutrients necessary for life. Class discussions focus on global change and the effects of more recent anthropogenic influences. Prerequisite: college level chemistry or biochemistry and ecology.
BIOL600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
BIOL700V Doctoral Dissertation (Sp, Su, Fa) (1-12) Prerequisite: graduate standing. May be repeated for 12 hours.

CELL AND MOLECULAR BIOLOGY (CEMB)

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• Distinguished Professors Millett, Oosterhuis
• University Professors Koeppe, TeBeest
• Professors Anthony, Bacon, Bottje, Correll, Davis, Deaton, Durdik, Etges, Fritsch, Gergerich, Hargis, Johnson, Kuenzel, Li, Morelock, Murphy, Rhoads, Slavik, Spiegel, Stephenson, Stewart, Stripling, West, Wideman, Yu
• Associate Professors Beitle, Burgos, Chen, Erf, Henry, Ivey, Korth, Kral, Kreider, Lehmann, Matlock, McNabb, Paul, Pinto, Rosenkrans, Savin, Srivastava, Stites, Szalanski, Yang, Ziegler
• Assistant Professors Blair, Curtin, Goggin, Iqbal, Kavdia, Kim, Kwon, Lindstrom, Pumford, Sakon, Silberman

Degrees Conferred:

M.S., Ph.D. (CEMB)

Areas of Concentration: Graduate studies may be pursued in any area of Cell and/or Molecular Biology, including the study of various aspects of cell function, structure, metabolism, and chemical functions on, within, and between cells; the study of biomolecular

interactions; the relationships between biomolecular reactions and observed cellular properties; molecular genetics, protein chemistry, biological structures; as well as the use of molecular detection methods to detect or characterize biological states in animal and plant sciences, systematics, forensics, and health care.

Admission to Degree Program: All applicants must have a B.A. or B.S. in a basic or applied science. Applicants must present Graduate Record Examination scores for the Verbal and Quantitative tests, and the GRE writing instrument. For admission, a student must have a sponsoring faculty member. The sponsoring faculty member will submit probable thesis subjects to the Program Committee prior to acceptance of the student. Once an applicant has been approved by the Program Committee, applications are forwarded to the Graduate School for application for admission to the Graduate School. Admitted and sponsored students will be responsible for the Graduate School's application fee unless paid by the department of the sponsoring faculty member.

Requirements for the Master of Science Degree: For the M.S. degree, the Graduate School and/or the program requires 30 semester hours, a comprehensive examination, a cumulative GPA of 3.00, and a minimum residence of 30 weeks. Any student who receives a grade of "D" or "F" in any graduate-level course will be subject to dismissal following review by the program committee. All candidates for the M.S. must complete a minimum of 24 hours of post-baccalaureate graduate credits not including seminar and thesis credit hours (18 hours plus CHEM 5813 and CHEM 5843) in Cell and Molecular Biology-approved courses and 6 hours of thesis research. In addition, all candidates must enroll every fall and spring semester in the Cell and Molecular Biology designated seminar course. All M.S. candidates must complete a thesis based on their research and pass a comprehensive oral examination based on the thesis. Examination and approval of the thesis is by the student's Graduate Thesis Committee. In addition, all candidates must give a public presentation of their thesis work as part of the Cell and Molecular Biology seminar course during their final semester.

Requirements for the Doctor of Philosophy Degree: Candidates for the Ph.D. must complete 18 hours of dissertation research. Students wishing to bypass the M.S. for a Ph.D. must complete a minimum of 24 hours of course work in Cell and Molecular Biology approved course work and a minimum of 18 hours of dissertation research. In addition, all candidates must enroll every fall and spring semester in the Cell and Molecular Biology designated seminar course. Any student who receives a grade of "D" or "F" in any graduate-level course will be subject to dismissal following review by the program committee. All Ph.D. students must complete the Candidacy Examination. The Candidacy Examination for the Ph.D. will consist of the writing of an original research proposal using the guidelines for a federally funded post-doctoral fellowship (e.g., NIH, NSF, USDA) and an oral examination over the proposal, related subjects, and general knowledge. The written and oral portions of the candidacy examination must be completed within the Ph.D. candidate's first two calendar years in this program. Students in the Ph.D. track will, in collaboration with their Graduate Advising Committee, select a topic and format for their research proposal within the first year in the program. The proposal topic is to be within the field of Cell and Molecular Biology but on a subject distinct from the student's Ph.D. research. The written proposal is submitted to the student's Graduate Advising Committee for evaluation and approval or rejection. Students may submit the proposal more than once. Upon completion of an approved proposal the candidate must then pass an oral examination by the student's Graduate Advising Committee covering the proposal, related subjects as determined by the examining committee, and general knowledge relevant to research in Cell and Molecular Biology. Only upon satisfactory completion of the proposal and oral examination, as judged by the student's Graduate Advising Committee, does a student become a candidate for the Ph.D. Students who fail to complete the candidacy examination in the allotted time will be dropped from the Ph.D. program but may choose to become candidates for the M.S. The Ph.D. is granted not only for fulfillment of technical requirements but also for development and possession of critical and creative thought abilities in the areas of Cell and Molecular Biology. Evidence of these abilities is given through the completion of a dissertation. The student's Graduate Advising Committee will evaluate the dissertation and conduct an oral Final Examination of the candidate over the dissertation and any other subject matter deemed appropriate by the committee. Prior to the Final Examination, the Ph.D. candidate will present a public seminar as part of the Cell and Molecular Biology seminar course during the student's final semester.

Cell & Molecular Biology (CEMB)

CEMB590V Special Topics in Cell and Molecular Biology (Irregular) (1-6) Consideration of new areas in Cell and Molecular Biology not yet treated adequately in textbooks or in other courses. This course may be repeated, provided subject matter is different for a maximum of 6 hours of credit. May be repeated for 6 hours.
CEMB5911 Seminar in Cell and Molecular Biology (Sp, Fa) Discussion of current topics in Cell and Molecular Biology. All graduate students in the Cell and Molecular Biology degree program must enroll every fall and spring semester in this course or an approved alternate seminar course. Prerequisite: graduate standing.
CEMB600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CEMB700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.

CHEMICAL ENGINEERING, RALPH E. MARTIN DEPARTMENT OF (CHEG)

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- Distinguished Professor Havens
- University Professor Turpin
- Professors Babcock, Beitle, Clausen, King, Penney, Spicer, Thoma, Ulrich
- Associate Professor Ackerson
- Research Professors Cross, Silano
- Adjunct Professors Muralidhara, Siebenmorgen
- Adjunct Associate Professor Eason
- Visiting Assistant Professor Teo
- Instructor Myers

Degrees Conferred:

M.S.Ch.E. (CHEG)
Ph.D. in Engineering (ENGR) (See Engineering)

The goal of the graduate program in the Ralph E. Martin Department of Chemical Engineering is to prepare the student for advanced roles in the profession through a combination of planned course work, research activities, examinations for Ph.D. candidacy,

and seminar participation. The graduate degree is not intended to be restrictive by forcing the student to specialize, but will broaden the graduate's intellectual abilities and enhance opportunities in research, teaching, management, and general engineering practice. The student's goals for pursuing an advanced degree, including preferences for a research topic, are given primary consideration in the preparation of the course of study. The student's advisory committee will assist in the definition of a diversified program to ensure competence as a practicing engineer.

Primary Areas of Faculty Research: Biological systems and food science; Chemical Hazards Research Center; chemical process safety; fate of pollutants in the environment; Integrated Petroleum Environmental Consortium; material science for microelectronics; chemical and biochemical separations; mixing in chemical processes; petroleum processing; supercritical fluids.

Admission to the Degree Program: The specific requirements for admission to the program and completion of an advanced degree in chemical engineering are determined by the Graduate School of the University of Arkansas and the Graduate Studies Committee of the Ralph E. Martin Department of Chemical Engineering. A general summary of departmental requirements is given below and detailed information may be obtained from the CHEG Web site at http://www.cheg.uark.edu/graduate.asp.

An undergraduate degree in chemical engineering is preferred for admission, but students with a B.S. in another field of engineering or in a natural science may also enter the program, provided that certain undergraduate chemical engineering courses are included in their overall program of study. The requirements for admission to the department's graduate program are:

- A grade point average of 3.00 out of 4.0 in chemical engineering, natural science or other engineering program. If the student's undergraduate institution uses a grade scale not based on 4.0, the Graduate School will convert the student's grades to a 4.0 scale.
- A minimum GRE score of 700 on the quantitative section of the exam and a minimum of 1200 combined score on the quantitative and verbal sections, taken within five years prior to application.
- For students without a B.S. degree from a U.S. university, a minimum TOEFL score of 550 (for the paper exam), 80 (for the Internet-based), or 213 (for the computer exam) or a score on the IELTS of at least 6.5 taken within two years prior to application.
- To enter the Ph.D. program, a majority vote by the Graduate Studies Committee of the Ralph E. Martin Department of Chemical Engineering is required.

Financial aid may be available for the student's stipend and/or tuition on a case-by-case basis. This is decided in the department of Chemical Engineering.

Research Program: An interactive, hands-on program is used to expose the graduate student to the techniques, procedures, and philosophy necessary for successful and ethical research. The students will work closely with their supervising professor and committee to perform original research on a topic of importance to the profession. The student will participate in the planning, managerial, budgetary, experimental, and reporting aspects of his/her research projects. The result will be a thesis (for the Master's degree) or a dissertation (for the Ph.D.), both of which should result in at least one journal or conference publication for the student. Active research interests of the faculty are listed on the Web at http://www.cheg.uark.edu/research.asp.

General Requirements for the M.S. Degree: 24 hours of course work consisting of nine hours of graduate-level CHEG graduate core courses (including CHEG 5113), three hours of CHEG electives, six hours of mathematics, and six hours of electives. Also, research resulting in a successfully-defended thesis, six hours of Master's Thesis credits, enrollment in the CHEG Graduate Seminar each semester, and assisting in departmental teaching are required.

General Requirements for the Ph.D. from the M.S. Degree: 24 hours of course work consisting of graduate-level CHEG and core courses, CHEG electives, mathematics, and electives as determined by the student's advisory committee. Also, research resulting in a successfully-defended dissertation, 24 hours of Doctoral Dissertation credits if the student successfully defended a Master's thesis or 30 if not, passing the department's Ph.D. candidacy and qualifying exams, enrollment in the CHEG Graduate Seminar each semester, and assisting in departmental teaching are required.

A non-thesis M.S. can be earned by students in the Ph.D. program if they enter the program without an M.S. in CHEG, pass 30 hours of course work of the 48 required for the Ph.D. with a GPA of at least 3.00, pass the department's Ph.D. candidacy and qualifying exams, and receive the approval of their advisory committee. A non-thesis M.S. is not available as the terminal degree.

Detailed requirements are in the Chemical Engineering Department Graduate Student Handbook, available at http://www.cheg.uark.edu/graduate.asp.

Chemical Engineering (CHEG)

CHEG4263 Environmental Experimental Methodology (Irregular) Introduction to experimental design, environmental analytical method quality assurance of analytical measurements, sample collection and preservation. Laboratory work necessary to support a field scale tracer experiment will be required. Prerequisite: senior or graduate standing.

CHEG4813H Honors Chemical Process Safety (Fa) Application of chemical engineering principles to the study of safety, health, and loss prevention. Fires and explosions, hygiene, toxicology, hazard identification, and risk assessment in the chemical process industries. Prerequisite: senior standing. (Same as CHEG 4813)

CHEG4813 Chemical Process Safety (Fa) Application of chemical engineering principles to the study of safety, health, and loss prevention. Fires and explosions, hygiene, toxicology, hazard identification, and risk assessment in the chemical process industries. Prerequisite: senior standing.

CHEG5013 Membrane Separation and System Design (Sp) Theory and system design of cross flow membrane process—reverse osmosis, nanofiltration, ultrafiltration, and microfiltration—and applications for pollution control, water treatment, food and pharmaceutical processing. Prerequisite: CHEG 3153.

CHEG5033 Technical Administration (Fa) Means and methods of planning, conducting, supervising, coordinating, and financing research, development, and engineering activities. Prerequisite: senior or graduate standing.

CHEG5113 Transport Processes I (Sp) Fundamental concepts and laws governing the transfer of momentum, mass, and heat. Prerequisite: CHEG 2313 (or equivalent) and MATH 3404.

CHEG5133 Advanced Reactor Design (Fa) Applied reaction kinetics with emphasis on the design of heterogeneous reacting systems including solid surface catalysis, enzyme catalysis, and transport phenomena effects. Various types of industrial reactors, such as packed bed, fluidized beds, and other non-ideal flow systems are considered. Prerequisite: MATH 3404 and CHEG 3333.

CHEG5213 Advanced Chemical Engineering Calculations (Sp) Developments of and solutions of equations and mathematical models of chemical processes and mechanisms. Prerequisite: CHEG 3333 and CHEG 3253.

CHEG5223 Petroleum Processing (Irregular) Introduction to petroleum production, field processing, and transportation. Prerequisite: CHEG 4413.

CHEG5273 Corrosion Control (Sp) Qualitative and quantitative introduction to corrosion and its control. Application of the fundamentals of corrosion control in the process industries is emphasized. Prerequisite: CHEG 2313.

CHEG5313 Planetary Atmospheres (IR) Origins of planetary atmospheres, structures of atmospheres, climate evolution, dynamics of atmospheres, levels in the atmosphere, the upper atmosphere, escape of atmospheres, and comparative planetology of atmospheres. (Same as SPAC 5313)

CHEG5333 Advanced Thermodynamics (Fa) Methods of statistical thermodynamics, the correlation of classical and statistical thermodynamics, and the theory of thermodynamics of continuous systems (non-equilibrium thermodynamics). Prerequisite: CHEG 3323.

CHEG5353 Advanced Separations (Sp) Phase equilibrium in non-ideal and multicomponent systems, digital and other methods of computation are included to cover the fundamentals of distillation, absorption, and extraction. Prerequisite: CHEG 4163.

CHEG5403 Organic Technology (Irregular) Major unit processes in the organic chemical field with emphasis on industrial applications including the thermodynamic, kinetic, and economic problems associated with the manufacturing and utilization of synthetic organic chemicals. Prerequisite: CHEM 3603 or CHEM 3613.

CHEG5513 Biochemical Engineering Fundamentals (Sp) An introduction to bioprocessing with an emphasis on modern biochemical engineering techniques and biotechnology. Topics include: basic metabolism (procaryote and eucaryote), biochemical pathways, enzyme kinetics (including immobilized processes), separation processes (e.g. chromatogra-

phy) and recombinant DNA methods. Material is covered within the context of mathematical descriptions (calculus, linear algebra) of biochemical phenomenon. Prerequisite: CHEG 3143.
CHEG5523 Bioprocessing (Fa) An introduction to the design, development, and scale-up of bioprocesses for the production of chemicals by fermentation. Major topics include fermentation kinetics, reactor design, process scale-up, and product recovery. Prerequisite: CHEG 3333.
CHEG5613 Microelectronics Fabrication and Materials (Odd years, Fa) Overview of microelectronics and semiconductors with emphasis placed on the manufacturing process rather than device physics. Topics include the various types of devices, the manufacturing flow, and criteria for materials selection. No prior knowledge of electronics is required. Prerequisite: ELEG 3903.
CHEG5723 Heat Transfer (Sp) Mechanics of heat transfer, followed by a detailed mathematical treatment of heat transfer by conduction, convection, and radiation (singly and in combination), and the application of heat transfer to design problems. Prerequisite: CHEG 3143 and senior or graduate standing.
CHEG5733 Polymer Theory and Practice (Sp) Theories and methods for converting monomers into polymers are presented. Topics include principles of polymer science, commercial processes, rheology, and fabrication. Prerequisite: CHEM 3603 or CHEM 3613.
CHEG5753 Air Pollution (Irregular) Fundamentals of air pollution causes, effects, and measurements, as well as control methods with application to current industrial problems. Prerequisite: graduate standing. (Same as CVEG 5753)
CHEG5801 Graduate Seminar (Sp, Fa) Oral presentations are given by master's candidates on a variety of chemical engineering subjects with special emphasis on new developments. Prerequisite: graduate standing.
CHEG588V Special Problems (Sp, Su, Fa) (1-6) Opportunity for individual study of an advanced chemical engineering problem not sufficiently comprehensive to be a thesis. Prerequisite: graduate standing. May be repeated for 6 hours.
CHEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CHEG6123 Transport Processes II (Fa) Continuation of CHEG 5113.
CHEG6203 Preparation of Research Proposals (Sp, Su, Fa) Prerequisite: doctoral students only.
CHEG6801 Graduate Seminar (Sp, Fa) Oral presentations are given by doctoral students on a variety of chemical engineering subjects with special emphasis on new developments. Prerequisite: graduate standing.
CHEG688V Special Topics in Chemical Engineering (Sp, Su, Fa) (1-3) Advanced study of current Chemical Engineering topics not covered in other courses. Prerequisite: doctoral students only. May be repeated for 3 hours.
CHEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

CHEMISTRY AND BIOCHEMISTRY (CHBC), DEPARTMENT OF

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- Distinguished Professors Millett, Pulay, Schäfer, Wilkins
- University Professors Hinton, Koeppe, Sears
- Professors Bobbitt, Davis, Durham, Fritsch, Gawley, Geren (C.), Peng, Smith
- Associate Professors Allison, McIntosh, Paul, Sakon, Stites
- Assistant Professors Tian, Vicic
- Research Assistant Professors Baker, Geren (L.), Greathouse, Kumar, Lay

Degrees Conferred:

M.S., Ph.D. in Chemistry (CHEM)

Areas of Concentration: Analytical, inorganic, organic, physical, biophysical, and biochemistry.

Primary Areas of Faculty Research: Four specialized centers complement traditional research areas in the Department of Chemistry and Biochemistry. These include the Center for Protein Structure and Function, the Center for Sensing Technology and Research, the Arkansas Center for Space and Planetary Sciences, and the State-Wide Mass Spectrometry Facility.

Admission to Graduate Program: In addition to the application for admission to the Graduate School and the transcripts required for Graduate School admission, applicants for admission to the degree programs of the Department of Chemistry and Biochemistry must submit a.) three letters of recommendation from persons familiar with the applicant's previous academic and professional performance and b.) official scores from the Graduate Record Examination (General Test). Advanced subject GRE tests scores (Chemistry, Biochemistry, etc.) are encouraged but not required.

Basic Program for Advanced Degree Candidates: In addition to the material given below, the student is referred to the general Graduate School requirements mentioned earlier in this catalog and to the bulletin *Information for Graduate Students in Chemistry and Biochemistry* available from the Department of Chemistry and Biochemistry.

1. An undergraduate program, consisting of courses in general chemistry, analytical chemistry (two semesters), organic chemistry (three semesters), physical chemistry (two semesters), and inorganic chemistry (one semester) provide an adequate foundation for graduate work in chemistry and biochemistry. If a graduate student lacks any part of this introductory program, it must be completed within the first four semesters as a graduate student. If the student has the necessary prerequisites, courses for graduate credit may be taken concurrently. Proficiency in physical chemistry must be demonstrated by satisfactory performance on placement examinations. Inadequate performance may be remedied by enrollment in one or more recommended courses.
2. The department has no foreign language requirement for either the M.S. or Ph.D. degree.
3. Each advanced degree candidate must present a suitable program of advanced courses and research. The specific courses needed to provide a basis for scholarly work beyond the B.S. level will vary with the student's undergraduate preparation, area of concentration and the degree sought. Individual course enrollments must be approved initially by the graduate advisor and subsequently by the student's advisory committee.
4. Every student must register for a minimum of one credit hour of CHEM 600V or 700V in each term during which the student is present and doing thesis or dissertation research. Post-candidacy doctoral students are required to be enrolled in at least one hour of dissertation credit (CHEM 700V) every semester (fall, spring, summer), until the degree is conferred.

Additional Requirement for Master of Science Degree: A thesis reporting original research will generally be required of all candidates for the Master of Science degree in chemistry. In certain rare cases, with the approval of the graduate faculty of the department, six hours of CHEM 500V may be substituted for the thesis. A detailed written report of the work in CHEM 500V must be prepared and successfully defended before the candidate's M.S. committee. The work will involve an extensive review of the chemical literature of a topic approved by the student's committee. The report will be a comprehensive, interpretive review of the literature similar in quality to that which would appear in a journal published by the American Chemical Society.

Additional Requirements for the Doctor of Philosophy Degree: A doctoral advisory committee is appointed to evaluate the candidate's preparation and to draw up a suitable program of study and research. This committee consists of the student's major professor and at least three other members of the graduate faculty. Under most circumstances, the major professor serves as the chairperson of that committee.

For chemistry students, the candidacy examination is of the cumulative type. Five cumulative examinations are given each semester in

each of the areas of concentration mentioned above. To complete the candidacy examination, seven of these cumulative examinations must be passed within a specified time, usually by the end of the fifth semester of graduate work.

Chemistry (CHEM)

CHEM4043 Environmental Chemistry (Even years, Sp) Application of chemical principles and techniques to specific environmental problems, and the chemical interrelationships among these problems. Topics include the chemistry of fossil fuels, new energy sources, energy storage concepts, air pollution, mineral resources, solid wastes, water and waste water treatment, pesticides, and toxic materials. Does not carry graduate credit for chemistry majors. Prerequisite: CHEM 1123 and CHEM 1121L and CHEM 3613 and CHEM 3611L (or CHEM 3713 and CHEM 3712L) and CHEM 3514 (or CHEM 3453).

CHEM4123 Advanced Inorganic Chemistry I (Fa) Reactions and properties of inorganic compounds from the standpoint of electronic structure and the periodic table. Emphasis on recent developments. Prerequisite: CHEM 3514.

CHEM4211L Instrumental Analysis Laboratory (Sp) Provides laboratory experience in parallel with the lecture material in CHEM 4213. Laboratory 3 hours per week. Pre- or Corequisite: CHEM 4213.

CHEM4213 Instrumental Analysis (Sp) Provides students, especially those in the agricultural, biological, and physical sciences, with an understanding of modern instrumental techniques of analysis. Lecture 3 hours per week. Prerequisite: CHEM 2262 and CHEM 2272 and CHEM 3613 and CHEM 3611L (or CHEM 3713 and CHEM 3712L) and CHEM 3514 (or CHEM 3453).

CHEM4723 Experimental Methods in Organic and Inorganic Chemistry (Fa) Introduction to the application of synthetic and spectroscopic methods in organic and inorganic chemistry, including mass spectroscopy, nuclear magnetic resonance, ultraviolet-visible, and infrared spectroscopy. Other laboratory techniques applicable to chemical research will be included. Lecture 1 hour, laboratory 6 hours per week. chemistry students may not receive graduate credit for this course and CHEM 5753. Corequisite: Drill component and Lab component. Prerequisite: CHEM 3613 and CHEM 3611L (or CHEM 3713 and CHEM 3712L) and CHEM 3504 and CHEM 3514.

CHEM4853 Biochemical Techniques (Sp) Techniques for handling, purifying and analyzing enzymes, structural proteins, and nucleic acids. Lecture 1 hour, laboratory 6 hours per week. Pre- or Corequisite: CHEM 5813 or CHEM 3813.

CHEM5043 Chemical Business (Irregular) This course is intended to introduce the topics of Value Creation and Business Strategy Development as applied to industrial chemistry. Topics in career development such as resume writing, company culture, etc. are included. Prerequisite: senior standing.

CHEM5101 Introduction to Research (Sp, Su, Fa) Introduces new graduate students to research opportunities and skills in chemistry and biochemistry. Meets 1 hour per week during which new students receive information from faculty regarding research programs in the department and training in the use of research support facilities available in the department.

CHEM5143 Advanced Inorganic Chemistry II (Irregular) Chemistry of metallic and non-metallic elements emphasizing molecular structure, bonding and the classification of reactions. Emphasis on recent developments. Prerequisite: CHEM 4123.

CHEM5153 Structural Chemistry (Irregular) Determination of molecular structure by spectroscopic, diffraction, and other techniques. Illustrative examples will be chosen mainly from inorganic chemistry. Pre- or Corequisite: CHEM 3504 and CHEM 4123.

CHEM520V Science Teachers Workshop (IR) (1-3) "Science Teachers Workshop" A course emphasizing hands-on demonstrations and laboratory exercises for K-12th grade science teachers. Selected current topics from the areas of biochemistry, chemistry, and physical science are discussed in a lecture format; grade appropriate exercises and demonstrations illustrating these topics are presented in a laboratory setting. Course cannot be counted toward the requirements for the B.S., B.A. or any graduate degree in chemistry and biochemistry. May be repeated for 6 hours.

CHEM5223 Chemical Instrumentation (Odd years, Sp) Use and application of operational amplifiers to chemical instrumentation; digital electronic microprocessor interfacing; software development and real-time data acquisition. Prerequisite: CHEM 4213 and PHYS 2074.

CHEM5233 Chemical Separations (Even years, Fa) Modern separation methods including liquid chromatography (adsorption, liquid-liquid partition, ion exchange, exclusion) and gas chromatography. Theory and instrumentation is discussed with emphasis on practical aspects of separation science. Prerequisite: CHEM 4213.

CHEM5243 Electrochemical Methods of Analysis (Even years, Sp) Topics will include: diffusion, electron transfer kinetics, and reversible and irreversible electrode processes; followed by a discussion of chronoamperometry, chronocoulometry, polarography, voltammetry and chronopotentiometry. Prerequisite: CHEM 4213 and MATH 2574.

CHEM5253 Spectrochemical Methods of Analysis (Odd years, Fa) Principles and methods of modern spectroscopic analysis. Optics and instrumentation necessary for spectroscopy is also discussed. Topics include atomic and molecular absorption and emission techniques in the ultraviolet, visible, and infrared spectral regions. Prerequisite: CHEM 4213.

CHEM5263 Nuclear Chemistry (Odd years, Fa) Nuclear structure and properties, natural and artificial radioactivity, radioactive decay processes, nuclear reaction and interactions of radiation with matter. Prerequisite: CHEM 3514.

CHEM5273 Cosmochemistry (Odd years, Sp) Laws of distribution of the chemical elements in nature, cosmic and terrestrial abundance of elements; origin and age of the earth, solar system, and the universe. Prerequisite: CHEM 3514.

CHEM5453 Quantum Chemistry I (Odd years, Sp) Fundamental quantum theory: Hamiltonian formalism in classical mechanics, Schrodinger equation, operators, angular momentum, harmonic oscillator, barrier problems, rigid rotator, hydrogen atom and interaction of matter with radiation. Prerequisite: CHEM 3504. (Recommended: MATH 3404).

CHEM5463 Quantum Chemistry II (Even years, Sp) Continuation of Quantum Chemistry I, Matrix formalism spin, atomic structure, the chemical bond, valence-bond, valence-bond method, molecular-orbital theory, symmetry, diatomic molecules, hybridization, conjugated systems; introduction to molecular spectroscopy, magnetic resonance, ligand-field theory, and theoretical techniques for molecular calculation. Prerequisite: CHEM 3514.

CHEM5473 Chemical Kinetics (Sp) Theory and applications of the principles of kinetics to reactions between substances, both in the gaseous state and in solution. Prerequisite: CHEM 3514.

CHEM5513 Biochemical Evolution (Even Years, Sp) Abiotic synthesis of biomolecules on Earth, the origin of cells, genetic information, origin of life on Earth and elsewhere, evolution and diversity, ecological niches, bacteria, archaea, eukaryotes, novel metabolic reshaping of the environment, life being reshaped by the environment, molecular data and evolution. Prerequisite: CHEM 5813.

CHEM5603 Theoretical Organic Chemistry (Fa) Introduction to the theoretical interpretation of reactivity, reaction mechanisms, and molecular structure of organic compounds. Application of theories of electronic structure; emphasis on recent developments. Prerequisite: CHEM 3514 and CHEM 3713 and CHEM 3712L.

CHEM5633 Organic Reactions (Fa) The more important types of organic reactions and their applications to various classes of compounds. Prerequisite: CHEM 3514 and CHEM 3713 and CHEM 3712L.

CHEM5753 Physical Methods in Organic Chemistry (Fa) Interpretation of physical measurements of organic compounds in terms of molecular structure. Emphasis on spectroscopic methods (infrared, ultraviolet, magnet resonance, and mass spectra). Prerequisite: CHEM 3712L and CHEM 3713 and CHEM 3514.

CHEM5813 Biochemistry I (Fa) The first of a two-course series covering biochemistry for graduate students in biology, agriculture, and chemistry. Topics covered include protein structure and function, enzyme kinetics, enzyme mechanisms, and carbohydrate metabolism. Prerequisite: CHEM 3712L and CHEM 3713 (or CHEM 3613 and CHEM 3611L) and CHEM 3514 (or CHEM 3453 and CHEM 3451L). (Same as CHEM 4813H)

CHEM5843 Biochemistry II (Sp) A continuation of CHEM 5813 covering topics including biological membranes and bioenergetics, photosynthesis, lipids and lipid metabolism, nucleic acid structure, structure and synthesis, and molecular biology. Prerequisite: CHEM 5813. (Same as CHEM 4843H)

CHEM600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

CHEM6011 Chemistry Seminar (Sp, Fa) Members of the faculty, graduate and advanced students meet weekly for discussion of current chemical research. Weekly seminar sections are offered for the Departmental seminar and for divisional seminars in biochemistry and in analytical, inorganic, nuclear, organic, and physical chemistry. Chemistry graduate students register for the Departmental seminar section and one of the divisional seminar sections each semester they are in residence. Seminar credit does not count toward the minimum hourly requirements for any chemistry graduate degree. Prerequisite: CHEM 3514 and CHEM 3712L and CHEM 3713 and senior or graduate standing. May be repeated for 1 hours.

CHEM619V Special Topics in Inorganic Chemistry (Irregular) (1-3) Topics which have been covered in the past include: technique and theory of x-ray diffraction, electronic structure of transition metal complexes, inorganic reaction mechanisms, and physical methods in inorganic chemistry. May be repeated for 99 hours.

CHEM6283 Mass Spectrometry (Sp, Odd Years) This course is devoted to the fundamental principles and applications of analytical mass spectrometry. Interactions of ions with magnetic and electric fields and the implications with respect to mass spectrometer design are considered, as are the various types of mass spectrometer sources. Representative applications of mass spectrometry in chemical analysis are also discussed. Prerequisite: graduate standing.

CHEM629V Special Topics in Analytical Chemistry (Irregular) (1-3) Topics that have been presented in the past include: electroanalytical techniques, kinetics of crystal growth, studies of electrode processes, lasers in chemical analysis, nucleosynthesis and isotopic properties of meteorites, thermoluminescence of geological materials, early solar system chemistry and analytical cosmochemistry. May be repeated for 99 hours.

CHEM649V Special Topics in Physical Chemistry (Irregular) (1-3) Topics which have been covered in the past include advanced kinetics, solution chemistry, molecular spectra, nuclear magnetic resonance spectroscopy, and methods of theoretical chemistry. May be repeated for 99 hours.

CHEM6633 Chemistry of Organic Natural Products (Irregular) Selected topics concerned with structure elucidation and synthesis of such compounds as alkaloids, antibiotics, bacterial metabolites, plant pigments, steroids, terpenoids, etc. Prerequisite: CHEM 5603 and CHEM 5633.

CHEM6673 Organic Reaction Mechanisms (Odd years, Fa) A detailed description of the fundamental reactions and mechanisms of organic chemistry. Prerequisite: CHEM 5633.

CHEM669V Special Topics in Organic Chemistry (Irregular) (1-3) Topics which have been presented in the past include heterogeneous catalysis, isotope effect studies of organic reaction mechanisms, organometallic chemistry, stereochemistry, photochemistry, and carbanion chemistry. May be repeated for 99 hours.

CHEM6823 Physical Biochemistry (Even years, Fa) Physical chemistry of proteins, nucleic acids, and biological membranes. Ultracentrifugation, absorption and fluorescent spectrophotometry, nuclear magnetic resonance spectroscopy, x-ray diffraction, and other techniques. Prerequisite: (CHEM 5813 and CHEM 3514) or graduate standing.

CHEM6863 Enzymes (Odd years, Fa) Isolation, characterization, and general chemical and biochemical properties of enzymes. Kinetics, mechanisms, and control of enzyme reactions. Prerequisite: graduate standing (or CHEM 5843 and CHEM 5813).

CHEM6873 Molecular Biochemistry (Odd years, Sp) Nucleic acid chemistry in vitro and in vivo, synthesis of DNA and RNA, genetic diseases, cancer biochemistry and genetic engineering. Prerequisite: CHEM 5813 and CHEM 5843.

CHEM6883 Bioenergetics and Biomembranes (Even years, Sp) Cellular energy metabolism, photosynthesis, membrane transport, properties of membrane proteins, and the application of thermodynamics to biological systems. Prerequisite: CHEM 5813 and

CHEM 5843.
CHEM700V Doctoral Dissertation (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

CHILDHOOD EDUCATION (CHED)

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- Associate Professors Gallavan, Imbeau
- Assistant Professors Collier, Eilers, Kirkpatrick
- Instructors Cronan, Riggs

Degree Offered:

M.A.T. (CHED)

The University of Arkansas offers the Bachelor of Science (B.S.E.) degree in Elementary Education and the Master of Arts in Teaching (M.A.T.) degree in Childhood Education. These combined degree programs constitute the University of Arkansas initial teacher licensure program in Childhood Education (Pre K through Grade 4). Students who obtain their B.S.E. degree from the University of Arkansas will have completed the prerequisite course requirements for entry into the M.A.T. program. Students who obtain a bachelors degree from another university and/or in a program area other than Elementary Education must have their transcripts evaluated by an Elementary Education program adviser to determine what deficiencies must be met before they can be considered for admission into the M.A.T. program. The M.A.T. degree program is a 33-semester-hour program. To be recommended for licensure by the University of Arkansas, students must complete the M.A.T. degree program.

Prerequisites to Degree Program: Enrollments will be limited in upper division professional studies courses in the Childhood Education B.S.E. Program. In addition, a maximum number of 75 students will be accepted into the M.A.T. Program in Childhood Education, contingent upon availability of placements with partnership schools. Specific application procedures and selection criteria are in effect to limit course enrollments and acceptance to the M.A.T. program. Please contact your childhood education faculty adviser for details regarding the selective admission process. Admission requirements for the M.A.T. degree program for initial certification are as follows:

1. Completion of an appropriate undergraduate degree program
2. Cumulative GPA of 3.00 in the last 60 hours of the baccalaureate degree
3. Admission to the Graduate School
4. Admission to the Teacher Education Program
5. Screening/Acceptance into partner school internship
6. Completion of the pre-education core with a minimum of "C" in all courses
7. Completion of all prerequisite courses in teaching field
8. Payment of internship fee.

Requirements for the Master of Arts in Teaching Degree: (Minimum 33 hours.)

Required M.A.T. Core: 10 hours
CIED 5012 Measurement/Research/Statistical Concepts for Teachers
CIED 5022 Classroom Management Concepts for Teachers
CIED 5032 Curriculum Design Concepts for Teachers
CIED 5052 Seminar: Multicultural Issues
ETEC 5062 Teaching and Learning with Computer Based Technologies

Required for Concentration in Childhood Education: 23 hours
CIED 5003 Childhood Seminar
CIED 5063 Contemporary and Futuristic Concerns of Childhood Education
CIED 5073 Case Study in Childhood Education
CIED 508V Childhood Education Cohort Teaching Internship (6 hours)
CIED 5162 Applied Practicum
CIED 5173 Literacy Assessment
CIED 5183 Readings in Early Childhood Education

CIVIL ENGINEERING (CVEG)

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Web: http://www.engr.uark.edu/Graduate/GradDegrees/Civil/index.html/

- University Professor Elliott
- Professors Dennis, Gattis, Gross, Hall, Selvam, Wang, Young
- Research Professor Buffington
- Associate Professors Edwards, Soerens
- Assistant Professors Hale, Heymsfield
- Adjunct Assistant Professor Williams (R.)
- Research Assistant Professors Tooley, Williams (S.)

Degrees Conferred:

M.S.C.E. in Civil Engineering (CVEG)
M.S.En.E. in Environmental Engineering (ENEG) (See Environmental Engineering)
M.S.T.E. in Transportation Engineering (TREG) (See Transportation Engineering)
M.S.E., Ph.D. in Engineering (ENGR) (See Engineering)

The Master of Science in Civil Engineering program is intended primarily for students possessing the Bachelor of Science in Civil Engineering degree. Students with degrees from other engineering disciplines may be admitted to the program but will be required to complete some undergraduate civil engineering courses as preparation for their graduate studies. The specific courses required will depend on the emphasis of their graduate studies.

The objectives of the M.S.C.E. program are to provide a greater depth of understanding of civil engineering topics for the practice of engineering and to serve as preparation for doctoral studies. Students are allowed a great deal of flexibility in designing their course of study. Students desiring to develop a deeper understanding of one sub-discipline area may select courses solely concentrated in that area while those desiring a broader-based education may select courses from several sub-disciplines including courses from other disciplines.

Primary Areas of Faculty Research: The Department of Civil Engineering has ongoing research programs in the environmental/water resources, geotechnical, structural, and transportation areas. The following is a more detailed listing of topics currently being studied in each of these areas:

Environmental/water resources area: Water and wastewater treatment; decentralized collection and treatment systems; soil and groundwater remediation; surface and ground water quality; storm water pollution prevention; environmental and hydrologic modeling; water quality studies.

Geotechnical area: Aggregates and base materials; geosynthetic reinforcement; embankment and slope stability; field instrumentation and measurement of soil properties; soil and groundwater remediation using geosynthetics; GIS application to geotechnical engineering; foundation design.

Structural area: High performance concrete; structural materials; bridge deck rehabilitation; computational mechanics; computational wind engineering and tornado modeling; structural earthquake analysis and modeling; structural steel design and analysis.

Transportation area: Facility design; highway geometrics; traffic operations and safety; pavement design and rehabilitation; asphalt concrete mixture design; construction materials characterization; construction quality control; geosynthetic reinforced flexible pavements; transportation management systems; high-speed pavement condition data acquisition; transportation and land development; ITS planning.

Requirements for the Master of Science in Civil Engineering Degree: Minimum 30 hours (thesis); 33 hours (non-thesis).

1. Candidates for the degree who present a thesis are required to complete a minimum of 24 semester hours of course work and a minimum of six semester hours of thesis.
2. Candidates for the degree who do not present a thesis are required to complete a minimum of 30 semester hours of course work plus three semester hours credit of CVEG 563V or CVEG 562V culminating in a written Master's Report completed under the direction of the candidate's major adviser.
3. Candidates for the degree must present a cumulative grade point average of 3.00 on all graduate courses and a cumulative grade point average of 2.50 on all deficiency courses. The minimum acceptable grade is "C."
4. Upon admission to the Graduate School and acceptance in a program of study, the candidate will be assigned to a major adviser, who in consultation with the department head, will select a graduate committee. The candidate will present to the committee a written statement of professional goals and objectives. The committee, meeting with the candidate, will design a suitable graduate program to achieve these goals and objectives and will serve as the examination committee for the thesis/report and the final oral and/or written examination. The committee will meet at least once each semester to review the progress of the student. A positive recommendation by the committee is required for subsequent registration of the student.

Civil Engineering (CVEG)

CVEG4003 CAD & Visualization for Civil Structures (Irregular) Design process of infrastructures using 3 Dimensional (3D) Computer Aided Design and Engineering visualization with a highway design emphasis. Students produce a digital video for a designed civil structure as a class project. Develop skills in photo matching for placement of designed structures in real environment. Prerequisite: senior standing.

CVEG4053 Land Surveying (Irregular) Historical background of property surveys. Detailed consideration of original surveys and the United States Public Land Surveys. Writing adequate land descriptions. Interpretation of old descriptions. Excess and deficiency. Riparian rights. Field practice in relocation of old corners. Prerequisites: senior standing and CVEG 2053.

CVEG4083 Control Surveys (Irregular) Sun and Polaris observations for astronomic azimuth, solar access studies; control traversing, leveling, triangulation; state plane coordinate systems. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CVEG 2053 and CVEG 2051L.

CVEG4143 Foundation Engineering (Sp, Fa) Analysis and design of retaining walls, footings, sheet piles, and piles. Determination of foundation settlements in sand and clay. Prerequisite: CVEG 1113 and CVEG 3133.

CVEG4153 Earth Structures (Irregular) The use of soil as a construction material including compaction, cement, lime, and fly ash stabilization. Special topics include seepage, slope stability, swelling, and collapsible soils. Prerequisite: CVEG 3133.

CVEG4243 Environmental Engineering Design (Sp, Fa) Application of physical, biological, and chemical operations and processes to the design of water supply and wastewater treatment systems. Prerequisite: CVEG 3223 and CVEG 3243.

CVEG4253 Small Community Wastewater Systems (Irregular) Design of innovative and alternative wastewater collection, transport, and treatment systems typically suited for rural and small community applications. Recitation 3 hours per week. Prerequisite: CVEG 3243.

CVEG4263 Environmental Regulations and Permits (Fa) Topics include federal and state environmental regulations, the permitting process, permit requirements and related issues. Prerequisite: CVEG 4243 and senior standing.

CVEG4303 Reinforced Concrete Design I (Sp, Fa) Design of reinforced concrete elements with emphasis on ultimate strength design supplemented by working stress design for deflection and crack analysis. Prerequisite: CVEG 2113 and CVEG 3304.

CVEG4313 Structural Steel Design I (Sp, Fa) Design of structural steel elements by elastic design the Load and Resistance Factor Design method. Intensive treatment of tension members, beams, columns, and connections. Pre- or Corequisite: CVEG 2113. Prerequisite: CVEG 3304.

CVEG4343 Reinforced Masonry Design (Irregular) Properties of masonry materials and assemblages. Masonry workmanship and quality control. Design of reinforced masonry elements against gravity and lateral loads. Design of masonry connections and joints. Application to 1- and 2-story buildings. Prerequisite: CVEG 4303.

CVEG4353 Timber Design (Irregular) Selection of timber beams, columns, and beam-columns. Physical properties of wood, analysis and design of timber connections. Truss design, glulam members, timber bridge design, treatment for decay, and fire protection. Pre- or Corequisite: CVEG 2113. Prerequisite: CVEG 3304.

CVEG4363 Prestressed Concrete Design (Irregular) Analysis and design of prestressed concrete flexural sections by working stress and ultimate strength design methods. Flexural behavior, moment-curvature diagrams, draping, anchorage zone design, torsion and shear, deflections, and prestress losses. Design of composite sections and continuous beams. Prerequisite: CVEG 4303.

CVEG4393 Reinforced Concrete Design II (Irregular) Shear strength, minimum thickness requirements, and deflection calculations for reinforced concrete structural slabs. Design of one-way and two-way structural slabs by the direct design and equivalent frame methods. Prerequisite: CVEG 4303.

CVEG4403 Public Transportation (Irregular) An introduction to the systems and technologies that provide the public transportation alternatives to the multi-modal transportation systems in urban and rural areas. A comparison of alternatives, procedures for planning, management and operations, and policies of public transportation. Prerequisite: CVEG 3413 or graduate standing.

CVEG4413 Pavement Evaluation and Rehabilitation (Irregular) Introduction of concepts and procedures for pavement condition surveys; evaluation by nondestructive and destructive testing; maintenance strategies; rehabilitation of pavement systems for highway and airfields; pavement management systems. Prerequisite: CVEG 4433.

CVEG4423 Geometric Design (Sp) The geometric design of streets and highways, based on theory and application of driver and vehicle characteristics. Prerequisite: CVEG 3413.

CVEG4433 Transportation Pavements and Materials (Sp, Fa) Study of the engineering properties and behavior of materials commonly used in transportation facilities as they relate to the design and performance of flexible and rigid pavement systems. Lecture 2 hours, laboratory 3 hours per week. Prerequisite: CVEG 3133 and CVEG 3413 and INEG 3133.

CVEG4513 Construction Management (Sp, Fa) Introduction to methods and procedures for management of civil engineering construction projects including organization, plans and specs, cost estimating and bidding, project planning and finance, quality control/ assurance, construction safety, cost management, labor issues, change orders, and subcontractor issues. Prerequisite: senior standing.

CVEG4803 Structural Loadings (Irregular) Theoretical background to and practical code requirements for various structural loadings. These include dead loads, occupancy loads, roof loads and ponding, snow loads, granular loads, vehicular loads, wind loading, and seismic loads. Prerequisite: CVEG 3304 and CVEG 4303 (or CVEG 4313).

CVEG4811 Environmenta Design Project (SP) Comprehensive engineering design project primarily related to environmental issues. Corequisite: CVEG 4243

CVEG4821 Geotechical Desing Project (FA) Comprehinsive engineering design project promarily related to geotechnical issues. Corequisite: CVEG 4143.

CVEG4831 Structural Design Project (SP) Comprehensive engineering design project primarily related to structural issues. Corequisite: CVEG 4323

CVEG4841 Transportation Desing Project (FA) Comprehensive engineering design project primarily related to transportation issues. Corequisite: CVEG 4433.

CVEG4852 Engineering Professional Practice Issues (FA,SP) Study of various issues related to the professional practice of engineering including ethics, professionalism, project procurement, social and political issues, project management, globalism, contract documents and other legal issues. Corequisite: CVEG 4811 or CVEG 4821 or CVEG 4831 or CVEG 4841.

CVEG5123 Measurement of Soil Properties (Irregular) Consideration of basic principles involved in measuring properties of soils. Detailed analysis of standard and specialized soil testing procedures and equipment. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CVEG 4143.

CVEG5143 Transportation Soils Engineering (Irregular) Advanced study of the properties of surficial soils; soil classification systems; pedology; soil occurrence and variability; subgrade evaluation procedures; repeated load behavior of soils; soil compaction and field control; soil stabilization; soil trafficability and subgrade stability for transportation facilities. Prerequisite: CVEG 3133.

CVEG5163 Advanced Soil Mechanics (Irregular) Study of consolidation, shear strength, clays, bearing capacity, and other soil mechanics topics. Emphasis on understanding the basis of soil mechanics topics. Prerequisite: CVEG 4143.

CVEG5173 Advanced Foundations (Irregular) Study of soil-supported structures. Topics include drilled piers, slope stability, pile groups, negative skin friction, foundation design from the standard penetration test and Dutch cone, and other specialized foundation design topics. Prerequisite: CVEG 4143.

CVEG5234 Water and Wastewater Analysis (Irregular) Application of chemistry to

environmental engineering. Quantitative determinations of constituents in water and wastewater. Principles of bacteriological laboratory techniques. Lecture 3 hours, laboratory 3 hours per week. Prerequisite: CVEG 3243.

CVEG5243 Groundwater Hydrology (Fa) Detailed analysis of groundwater movement, well hydraulics, groundwater pollution and artificial recharge. Surface and subsurface investigations of groundwater and groundwater management, saline intrusion and groundwater modeling will be addressed. Prerequisite: CVEG 3223.

CVEG5253 Microbiology for Environmental Engineers (Irregular) Fundamental and applied aspects of microbiology and biochemistry relating to water quality control, wastewater treatment, and stream pollution. Prerequisite: CVEG 3243.

CVEG5263 Stream Pollution Analysis (Irregular) The determination and application of deoxygenation and reaeration rates to stream pollution analysis. A study of biological degradation rates for municipal and industrial wastes. Prerequisite: CVEG 3243.

CVEG5273 Open Channel Flow (Sp) Open Channel Flow includes advanced open channel hydraulics, flow measurement techniques, a hydrology review, culvert and storm drainage facility design, natural channel classification (fluvial geomorphology) and rehabilitation, computer methods and environmental issues. Prerequisite: CVEG 3213 and CVEG 3223.

CVEG5283 Solid Waste Management (Irregular) Collection, processing and disposal of solid waste with emphasis on incineration, and sanitary landfilling systems. Supplementary transportation and transfer systems are included. Hazardous waste disposal design and regulatory considerations are discussed. Prerequisite: CVEG 3243.

CVEG5293 Water Treatment & Distribution System Design (Irregular) Design of industrial and municipal water treatment plants. Discussion of raw and treated water requirements for the several uses. Distribution system analysis and design including distribution storage and pumping. Prerequisite: CVEG 3243.

CVEG5313 Matrix Analysis of Structures (Irregular) Energy and digital computer techniques of structural analysis as applied to conventional forms, space trusses, and frames. Prerequisite: CVEG 3304.

CVEG5323 Structural Dynamics (Irregular) Dynamics response of single and multidegree of freedom systems. Modal analysis. Response spectra. Computer programs for dynamic analysis. Design considerations for structures subjected to time-varying forces including earthquake, wind, and blast loads. Prerequisite: CVEG 3304.

CVEG5343 Highway Bridges (Irregular) Economics of spans, current design and construction specifications, comparative designs. Possible refinements in design techniques and improved utilization of materials. Prerequisite: CVEG 4313 and CVEG 4303.

CVEG5383 Finite Element Methods in Civil Engineering (Irregular) An understanding of the fundamentals of the finite element method and its application to structural configurations too complicated to be analyzed without computer applications. Application to other areas of civil engineering analysis and design such as soil mechanics, foundations, fluid flow, and flow through porous media. Prerequisite: graduate standing.

CVEG5403 Advanced Reinforced Concrete II (Irregular) Design of circular and rectangular reinforced concrete tanks for fluid and granular loads. Prerequisite: CVEG 4303.

CVEG5413 Transportation and Land Development (Irregular) Study of interaction between land development and the transportation network. Application of planning, design, and operational techniques to manage land development impacts upon the transportation system, and to integrate land layout with transportation network layout. Prerequisite: graduate standing.

CVEG5423 Structural Design of Pavement Systems (Irregular) An introduction to the structural design of pavement systems including: survey of current design procedures; study of rigid pavement jointing and reinforcement practices; examination of the behavioral characteristics of pavement materials and of rigid and flexible pavement systems; introduction to structural analysis theories and to pavement management concepts. Prerequisite: CVEG 4433.

CVEG5433 Traffic Engineering (Irregular) A study of both the underlying theory and the use of traffic control devices (signs, traffic signals, pavement markings), and relationships to improved traffic flow and safety, driver and vehicle characteristics, geometric design, and societal concerns. Also includes methods to collect, analyze, and use traffic data. Prerequisite: CVEG 3413 or graduate standing.

CVEG5443 Transportation Planning Methods (Irregular) A study of the procedures, methodologies, and types of reports that are employed to plan for a variety of transportation needs, and how these transportation plans are developed and used. Prerequisite: graduate standing.

CVEG5453 Asphalt Mix Design and Construction (Irregular) Theory and practice of asphalt concrete mix design for pavements and bases including specifications and construction methods for hot-mixes and surface treatments. Lecture 2 hours, laboratory 3 hours per week. Prerequisite: CVEG 3413 and CVEG 4433.

CVEG5463 Transportation Network Modeling (Irregular) An analytical approach to the use of mathematical techniques and computer models to represent urban transportation systems. Deterministic and stochastic methods for trip generation, distribution, modal choice, and assignment. Prerequisite: CVEG 5443.

CVEG5473 Transportation System Characteristics (Irregular) Introduction to traffic flow theory, including traffic stream interactions and capacity. Applications for planning, design, operations. Prerequisite: CVEG 3413 and graduate standing.

CVEG5483 Transportation Management Systems (Irregular) Six transportation management systems are explored: pavement, bridge, intermodal, public transportation, safety, and congestion. System approaches are presented. Techniques are introduced on how to optimally allocate resources. Pavement and bridge structure basics are discussed and their performance parameters are presented. Case studies are used to illustrate the interfaces among various modes of transportation. Safety and congestion problems in transportation are addressed.

CVEG5493 Infrastructure Management with GIS & DB (Irregular) Use of the major components of a Geographical Information System (GIS). Learn to define project schema, create a project build categories and features, and perform database joints. Use of dynamic segmentation and multimedia capabilities. Application of Relational Database Management System (RDBMS) and database interface service to GIS. Introduction to Global Positioning System (GPS). Prerequisite: CVEG 3413.

CVEG562V Research (Sp, Su, Fa) (1-6) Fundamental and applied research. Prerequisite: graduate standing.

CVEG563V Special Problems (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

CVEG5734 Advanced Wastewater Process Design and Analysis (Irregular) Application of advanced techniques for the analysis of wastewater treatment facilities. Physical, chemical and biological processes for removing suspended solids, organics, nitrogen, and phosphorus. Laboratory treatability studies will be used to develop design relationships. Lecture 3 hours, laboratory 3 hours per week. Prerequisite: CVEG 5234.

CVEG5753 Air Pollution (Irregular) Fundamentals of air pollution causes, effects, and measurements, as well as control methods with application to current industrial problems. Prerequisite: graduate standing. (Same as CHEG 5753)

CVEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

CVEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

CLINTON SCHOOL (UACS)

James L. "Skip" Rutherford
Dean
Sturgis Hall, 1200 President Clinton Avenue
Little Rock, Arkansas 72201

Thomas A. Bruce
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Inaugural Faculty

University of Arkansas Clinton School
- Distinguished Professor Tolo
- Professors Bruce (UACS/UAMS), Hemphill, Pryor,
- Visiting Professors Goul (Arizona State), Tomkins (Nebraska)
- Adjunct Professors Ahlen, Divers-White
- Assistant Professors Meyers, Petett, Williams
- Adjunct Assistant Professors Chotard, Plummer
- Instructor Torvestad
- Adjunct Instructors Adams, Foglia, Gudahl, Kennedy, Matthews, Peterson

University of Arkansas
- Professors Farmer, Ferrier, Goforth, Miller, Reid, Riley, Swedenburg, Voth, Whayne
- Associate Professor Ritter

University of Arkansas for Medical Sciences
- Professors Allen, Cranford, DeAngelis-Long, Elders, Erwin, Hackler, Halverson, Lowe, Monoson, Yamauchi
- Associate Professors Compadre, Mays, Stewart, Thompson
- Assistant Professors Bynum, Edlund, Nash, Pope, Roddy, Sayyed
- Instructors Lindsey, McKindra, Sparks
- Librarian Mann (UAMS)

University of Arkansas at Little Rock
- Professors Baldwin, Brenton, DiPippa, Hemphill, Lewis, Martin, May, Scranton, Sink,
- Associate Professors Edwards, Hill, Rollberg
- Assistant Professors Jordan, Lubecki, Robertson, Turturro
- Instructors Kaplan, Mock

University of Arkansas at Monticello
- Associate Professor Pelkki

University of Central Arkansas
- Professor Wekkin
- Assistant Professors McCalman, Standerfer

Hendrix University
- Associate Professor Barth

Degree Conferred:

Certificate of Public Service (non-degree)
Master of Public Service (MPS)

The mission of the Clinton School of Public Service of the University of Arkansas (UACS) is to educate and prepare individuals for public service that incorporates a strategic vision, an authentic voice, and a commitment to the common good. The primary purpose of UACS is to harness the University's overarching commitment in teaching, research, and service to the preparation of today's current and emerging leaders. As such, UACS will be a learning destination for people who are motivated to serve others and seek practical professional knowledge and experience about domestic and global career options. It is anticipated that many who are accepted into the master's degree program will be individuals with substantial prior involvement in the service sector.

Requirements for Admission to the Degree Program: Applicants for the MPS program will be expected to have been engaged in significant public service experience (a minimum of two years) prior to enrollment. In addition, a baccalaureate degree, a personal statement or letter of interest (500 to 700 words), an applicant interview, three letters of reference (one academic, one personal, and one of prior community/public service), and a current *curriculum vitae* or *résumé* will be required. Applicants must provide original transcripts of all prior collegiate academic work. In addition, all international applicants, including resident and non-resident aliens, whose native language is not English and who do not have an undergraduate degree from a regionally accredited U.S. college or university, will be required to document by an original copy of the test sent by the testing agency to UACS a minimum score of 550 on the paper-based or 213 on the computer-based Test of English as a Foreign Language (TOEFL) examination. Students seeking to enter the MPS program must also provide proof by an original copy sent by the testing agency to UACS of recently taking (within the past five years) the Graduate Record Examinations (GRE) and their scores. MPS program applicants who have completed a master's, doctoral or professional degree or the UA Clinton School Certificate in Public Service program are exempt from the GRE requirement. Subject to the approval of the Student Admissions and Financial Aid Committee, scores on comparable graduate tests may be accepted as a substitute for the GRE requirement. The Student Admissions and Financial Aid Committee shall consider the sum total of the applicant's work and educational experience and shall not allow a single factor to outweigh others in making recommendations for admission.

Requirements for Admission to the Certificate: Applicants seeking to enroll in the Certificate in Public Service Program in the Clinton School must submit a completed application form, an application fee, and other documentation as outlined herein. All application forms must be accompanied by a personal statement or letter of interest (500 to 700 words), three letters of reference (one academic, one personal, and one of prior community/public service), a current *curriculum vitae* or *résumé*, and a copy of college transcripts showing post-secondary credits. All international applicants, including resident and non-resident aliens, whose native language is not English and who do not have an undergraduate degree from a regionally accredited U.S. college or university, are required to document by an original copy of the test sent by the testing agency to UACS a minimum score of 550 on the paper-based or 213 on the computer-based Test of English as a Foreign Language (TOEFL) examination. The Student Admissions and Financial Aid Committee shall consider the sum total of the applicant's work and educational experience and shall not allow a single factor to outweigh others in making recommendations for admission.

Requirements for the Certificate: The Certificate of Public Service program requires 13 semester credit hours:

	HOURS
Analysis for Decision-Making in Public Service	3
Leadership in Public Service	3
Communication Processes and Conflict Transformation	3
Dynamics of Social Change	3
Ethical and Legal Dimensions of Leadership	1
Total	13

Requirements for the Degree: The Master of Public Service (MPS) degree program requires 36 semester credit hours for students with in-depth experience in public service. Of this, 13 hours are in core courses. In addition, each MPS student will be required to participate in 6 semester hours of a capstone project and 12 semester hours from selective (internship) and elective options courses to (a) strengthen a student's particular skills, (b) prepare the student for the capstone experience, or (c) work toward an applied interest field such as rural development, conflict transformation, or nonprofit organizational management. A five-credit-hour practicum is required of all students.

The following curriculum of core, elective, and capstone courses is required for completion of a Master of Public Service from the Clinton School. Students without extensive prior experience in public service will be required to take an additional five credit hour practicum not described below.

Required Core	HOURS
Analysis for Decision-Making in Public Service	3
Leadership in Public Service	3
Communication Processes and Conflict Transformation	3
Dynamics of Social Change	3
Ethical and Legal Dimensions of Public Service	1
Electives/Selectives (including 3 credit-hour internship)	12
Practicum	5
Capstone Sequence	6
Program Total	36

COMMUNICATION (COMM)

Robert Brady
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- Professors Frentz, Smith, Webb, Wicks
- Associate Professors Allen, Amason, Brady, Rosteck, Scheide, Warren
- Assistant Professor Chung

Degree Conferred:

M.A. (COMM)

Areas of Concentration: Communication, with general studies of the discipline or with specific emphasis areas in: 1) rhetoric and public communication; 2) interpersonal/small group/organizational communication; or 3) mass communication (television and film studies). Each student will design a specific curriculum of study in consultation with his or her major professor, and it may include one of the above emphasis areas. A student who plans to teach in the public schools may elect a combination of courses appropriate for the teaching area.

Prerequisites to Degree Program: A student entering graduate studies should have a minimum of 24 semester hours in undergraduate credit within the area of communication or closely related studies. A student who presents less than 24 hours may be admitted with deficiencies subject to the decision of the department. A student may eliminate deficiencies while concurrently enrolling in graduate courses. In addition, prospective students must supply: 1) three letters of recommendation, 2) an essay-length writing sample, 3) a statement of their goals for graduate study in Communication, and 4) scores from the GRE examination.

Requirements for a Master of Arts Degree: A minimum of 30 semester hours in graduate-level courses or 24 hours of course work and a thesis (6 hours). The following departmental requirements must be met by students pursuing the M.A. in Communication: a) At least one course must be completed from two of the three emphasis areas (rhetoric and public communication; interpersonal, small group, and organizational communication; and mass communication); b) Two graduate courses in communication research methods (COMM 5123 and one of the following: COMM 5113, 5353, or 5143); c) In addition to the two required methods courses, at least five three-hour 5000-level courses must be completed in the Department of Communication; d) The remaining hours of graduate credit must be selected from the following options: 1) Additional 5000-level departmental seminars; 2) 4000-level courses in the Department of Communication that are approved for graduate credit. However, students are strongly urged to limit the number of 4000-level courses to no more than six hours; 3) Up to six hours of graduate-level courses outside the department that directly relate to the student's plan of study; 4) Three hours of internship credit in COMM 5913; 5) Up to six hours of credit in COMM 590V; 6) Up to six hours of thesis credit. In addition to the above requirements, each student must enroll in COMM 5111 during his or her first semester of resident graduate study in which it is offered. Hours earned in COMM 5111 will not count towards the minimum hours listed above. Each student must pass a comprehensive examination over the thesis and/or all course work.

Communication (COMM)

COMM4113 Legal Communication (Fa) Examines communication processes in the legal environment and focuses on communication skills and behaviors among judges, attorneys, litigants, and jurors. Particular attention will be given to verbal strategies and nonverbal messages related to interviews, negotiation, mediation, and litigation and to the rhetorical functions of legal pleadings and judicial opinions.

COMM4123 Communication, Gender, and Popular Culture (Irregular) Studies representations of femininity and masculinity in popular culture contexts such as magazines, videos, television, advertising, film, popular music, and sports. Examines the various ways that media representations affect gender identities.

COMM4143 American Film Survey (Sp, Su, Fa) A survey of major American film genres, major directors and films that have influenced the development of motion pictures. (Same as ENGL 4143)

COMM4283 Communication in Contemporary Society (Fa) An examination of research and theory on the process and effects of communication in modern society.

COMM4313 Language and Society of Japan (Fa) The primary objective of this course is to investigate the way the Japanese language reflects the beliefs and customs of the Japanese people as a social group. For comparison purposes, this course makes reference to studies in American language and culture. Proficiency in Japanese not required. Prerequisite: junior standing. (Same as AIST 4313,SOCI 4313)

COMM4323 Communication and Conflict (Sp) Study of the processes, effects, and managements of communicative conflict, including a consideration of conflict styles, power, goals, tactics, assessment, self-intervention and third-party intervention. Prerequisite: COMM 1313 and junior standing.

COMM4333 Communication and Gender (Sp) Study of the nature, construction, functions, and effects of gender and gender-role stereotypes related to verbal and nonverbal communication, small-group and organizational interaction, and mass medicated images in contemporary culture.

COMM4343 Intercultural Communication (Fa) Study of intercultural communication skills, intercultural issues and their impact at home and abroad, and cross-cultural comparisons of communication phenomena from a variety of theoretical perspectives.

COMM4353 American Public Address (Irregular) Historical and critical study of the leading American speakers, their speeches, the issues with which they were identified. Lectures, discussion, reports, and critical papers. Prerequisite: junior standing.

COMM4373 Political Communication (Sp) Study of the nature and function of the communication process as it operates in the political environment. (Same as PLSC 4373)

COMM4383 Rhetoric of the Modern American Presidency (Sp, Su, Fa) A study of the increasing reliance of contemporary presidents on public persuasion through rhetorical discourse.

COMM4393 Freedom of Speech: Cases & Issues (Sp, Fa) Study of philosophy, cases, and issues relevant to the first amendment right to the free expression, with focus on issues relevant to internal security, obscenity, pornography, slander, and the regulation of communication.

COMM4413 Communication, Negotiation, Mediation and Conflict (Irregular) Examines Alternative Dispute Resolution (ADR) research and techniques focusing primarily on negotiation and mediation. Supplements and extends material presented in COMM 4323 (Communication and Conflict). Explores the verbal and nonverbal messages occurring during negotiation and mediation situations in business, legal, and counseling environments. Prepares students for roles involving negotiation and mediation.

COMM4623 Relational Communication (Sp) Review of the major theories and concepts in a relational approach to interpersonal communication. Provides exposure to a sampling of the research findings in relational communication.

COMM4633 History and Development of International Film (Sp) A critical survey of international film as a distinctive art form and as a medium of expression and communication with attention given to films and cinema from its origins to the present.

COMM4683 Documentary Film (Fa) A study and analysis of the documentary film as a discrete film form and as an important contribution to the international cinematic scene. Prerequisite: advanced standing.

COMM4793 Directing Forensics (Irregular) Planning, directing, and coaching co-curricular forensics at the high school or college or both.

COMM4823 Children and Media (Sp) An in-depth examination of children's use of media and the effects of media content on child and adolescent development. Topics may include violence and sex in media, commercialism, and new media.

COMM4833 Television Writing (Fa) Comprehensive analysis of the techniques and styles of television commercials, documentaries and dramatic TV plays. Class projects. Prerequisite: 5 hours radio-television-film and junior standing. (Same as COMM 4833I)

COMM4843 Computer-Mediated Communication (FA) Provides an in depth consideration of the nature of computer-mediated communication by examining its use and effects in interpersonal, work, educational, and societal contexts and in an introduction to the technologies and skills required for navigating the Internet. The course focuses on the social aspects of computer-mediated communication, rather than specific software or hardware technologies.

COMM4853 Telecommunication Policy (Sp) Research and discussion of social, ethical, education, cultural, and technological aspects of telecommunications with attention given to changing programming patterns, world systems of broadcasting, data transmission, emerging technology, international politics, and regulatory policies. Prerequisite: junior or senior or graduate standing.

COMM4863 Seminar in Television (Sp) Research/discussion of contemporary problems in television. Emphasis on the economic and social impact of commercials, news, censorship, children's programs, blacks and women on television, and future developments in telecommunications.

COMM4883 Television and American Culture (Fa) Historical and critical study of how television shapes American culture and is shaped by it. Attention will be given to the study of television history, programs and audiences; particularly how race and gender shape content and reception of programming. Prerequisite: COMM 2333.

COMM5111 Colloquium in Communication Research (Sp, Fa) Presentation, evaluation, and discussion of research proposals or on-going research projects. Graduate students are required to register for this course each semester of residence. May be repeated.

COMM5113 Historical and Legal Methods in Communication (Fa) Emphasizes the assumptions and procedures of historical and legal research methods in communication. May be repeated for 3 hours.

COMM5123 Quantitative Research Methods in Communication (Fa) Emphasizes the assumptions and procedures of social scientific research methods in communication.

COMM5133 Media Processes & Effects (FA) Introduction to scholarly research and theory in media processes and effects. Particular attention will be devoted to the impact of media messages on individuals and societies. Emphasis will be placed on the construction and development of theory.

COMM5143 Ethnographic Methods in Communication (Fa) This class focuses upon the fieldwork procedures and narrative writing strategies that comprise the methods of ethnographic research in communication. Students conduct fieldwork requiring in-depth interpersonal contact with members of a group or culture, and practice narrative writing skills.

COMM5193 Seminar in Communication (Sp, Su, Fa) Research, discussion, and papers focus on one of a variety of communication topics including symbolic processes in communication, philosophy of rhetoric, communication education, criticism of contemporary communication, interpersonal communication, organizational communication, and contemporary applications of rhetoric. Maximum credit is 9 semester hours. Prerequisite: graduate standing. May be repeated for 3 hours.

COMM519V Seminar in Communication (Sp, Su, Fa) Research, discussion, and papers focus on one of a variety of communication topics including symbolic processes in communication, philosophy of rhetoric, communication education, criticism of contemporary

communication, interpersonal communication, organizational communication, and contemporary applications of rhetoric. Maximum credit is 9 semester hours. Prerequisite: graduate standing. May be repeated for 3 hours.

COMM5303 Seminar in Classical Rhetoric (Sp) Systematic investigation of the development of rhetorical theory in the Classical world with emphasis upon the contributions of Plato, Aristotle, Socrates, Cicero and Quintilian. Gives some consideration to the chief treatises of the medieval period. Lectures, oral and written reports, including a major research essay. Prerequisite: graduate standing.

COMM5323 Seminar in Persuasion (Fa) Focus is on comparing theoretical accounts of persuasion and research evidence concerning the effects of various factors on persuasion.

COMM5333 Communication Theory (Sp) Survey of the theoretical orientations in communication theory with primary focus on conceptual, theoretical, and philosophical issues.

COMM5343 Interpersonal Communication (Fa) Theory and research concerning the exchange of information and the mutual influencing of behavior among people. Prerequisite: graduate standing.

COMM5353 Rhetorical Criticism (Sp) A seminar in rhetorical criticism. A study of the development of standards of rhetorical appraisal from the foundations of the art of speaking to the modern period; examination of contemporary approaches to rhetorical appraisal and pactice in critical analysis of contemporary address.

COMM5363 Seminar in Small Group Communication (Su) A consideration of recent developments in small group research which relate to problem solving tasks, leadership and other kinds of human interaction through speech communication. Emphasis given to the interpersonal speech transaction and to the emergence of participant roles. Prerequisite: COMM 3303 or SOCI 4193. (Same as SOCI 5363)

COMM5373 Content Analysis (Irregular) Techniques for observing and analyzing the overt communication behavior of selected communicators. Prerequisite: graduate standing.

COMM5383 Seminar in Political Communication (Irregular) Research seminar focusing on selected topics such as candidate imagery, diffusion of political information, or political symbolism. Prerequisite: graduate standing. (Same as PLSC 5383)

COMM5393 Seminar in Contemporary Rhetoric (Sp) Systematic study of contemporary perspectives on rhetoric including scholars such as Burke, Richards, Weaver, Grassi, MacIntyre, Derrida, and Rorty. Prerequisite: graduate standing.

COMM5403 Organizational Communication Theory (Sp) A seminar on the historical development of theory and research into communication processes occurring within an organizational setting. Lecture, discussion, oral and written reports. Prerequisite: graduate standing.

COMM5413 Organizational Communication Research (Su) A seminar on conducting applied research within an organizational setting. Prerequisite: COMM 5403 and graduate standing.

COMM5423 Seminar in Mass Media Cognition (SP) Seminar exploring how people learn from written, aural and visual mass media messages. Topics to include attention, memory, comprehension, emotional response, arousal, unconscious processing, picture perception and person perception. Seminar will be concerned with most popular media (e.g., television radio, newspaper, and film), and with several content genres (e.g., entertainment, news, advertising).

COMM5433 Marital Communication (Even years, Sp) An exploration of the major theories and lines of research that examine marital communication in contemporary American life.

COMM5443 Issues of Race and Gender in Interpersonal Communication (Odd years, Sp) An exploration of the major theories and lines of research that examine how race and gender influence interpersonal communication in everyday life in America.

COMM5453 Myth and Communication Criticism (Sp) Seminar in major theories of mythology, including archetypal and ideological perspectives, and their applications to the criticism of public communicative events. Practice in written critical analysis. Prerequisite: graduate standing.

COMM5503 Communication and Cultural Studies (Fa) Examinations of the role of communication in modern culture. Emphasis is upon the production and circulation of meanings with society, and special attention is given to the role of popular and mass media in this process. Prerequisite: graduate standing.

COMM5533 Family Communication (Even years, Fa) An exploration of the major theories and lines of research that examine family communication in contemporary American life.

COMM569V Seminar in Film Studies (Irregular) (1-3) Research, discussion; papers on a variety of film genres and areas including the new American film, the science-fiction film, directors, film comedy, the experimental film, criticism, and the film musical. (Same as ENGL 569V)

COMM590V Special Problems (Sp, Su, Fa) (1-6) Credit by arrangement. Prerequisite: graduate standing. May be repeated.

COMM5913 Internship in Communication (Sp, Su, Fa) Internship in applied communication within public and private organizations. Prerequisite: 15 hours graduate level communication in residence.

COMM5993 Readings In Cultural Studies (Irregular) Classic and current theoretical approaches to cultural studies. subject matter changes depending on student interest and faculty expertise.

COMM600V Master's Thesis (Sp, Fa) (1-6) Prerequisite: graduate standing.

COMMUNICATION DISORDERS (CDIS)

Barbara E. Hinton
Head, Department of Rehabilitation, Human Resources and Communication Disorders

Barbara B. Shadden
Director, Program in Communication Disorders

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- Professor Shadden
- Associate Professor Toner
- Assistant Professor Hagstrom
- Research Associate Aslin
- Instructor McGehee

Degree Conferred:

M.S. (CDIS)

Description and Requirements for the Master of Science Degree: (Minimum 36 academic credit hours, not counting clinical practicum credit hours.) The M.S. degree program in communication disorders (emphasis in speech-language pathology) is designed to ensure that all degree candidates meet the minimum academic and clinical practicum requirements for the Certificate of Clinical Competence in Speech-Language Pathology of the American Speech-Language-Hearing Association (ASHA). The program is accredited by ASHA's Council on Academic Accreditation. The degree program requires a minimum of five academic semesters to complete, including continuous enrollment in the summer session between the first and second years. Thesis and non-thesis options are available. All candidates for the M.S. degree are required to pass a written comprehensive examination.

Prerequisites to Degree Program: Applicants to the M.S. degree in speech-language pathology are expected to have completed prerequisite course work in normal speech, language, and hearing functions, normal development, and speech-language and hearing disorders, as well as biological and physical sciences, behavioral and social sciences, and mathematics. Prospective applicants with undergraduate degrees in other disciplines should contact the Program Director for further information. Applicants for graduate study in speech-language pathology must be admitted to the Graduate School and must also meet the following requirements: 1) satisfactory GRE scores, and 2) three letters of recommendation from persons competent to judge applicant's potential for graduate studies. To be considered for admission to the M.S. degree program, applicants must have earned an overall GPA of 3.00 in undergraduate course work or must obtain a minimum composite score of 1000 on the verbal and quantitative subtests of the Graduate Record Examinations.

Communication Disorders (CDIS)

CDIS4133 Introduction to Aural Rehabilitation (Sp) Study of the technique used in the rehabilitation of speech and language problems of the hearing impaired including the role of amplification, auditory training, and speech reading in rehabilitation. Prerequisite: CDIS 3103.

CDIS4183 Clinical Assessment of Speech and Language Disorders (Fa) Study of the basic diagnostic procedures used in speech-language pathology. Emphasis is placed on the clinical processes of assessment, including criteria for test selection, techniques in test administration, and interpretation of test results. Prerequisite: prior coursework in CDIS.

CDIS4213 Introduction to Speech and Hearing Science (Sp) Study of the acoustic structure of oral speech and the auditory skills underlying speech perception. Prerequisite: CDIS 3203, CDIS 3213, CDIS 3124 and its lab component.

CDIS4223 Language Disorders in Children (Sp) Study of disorders of language acquisition and usage in children and adolescents, with emphasis upon the nature, assessment, and treatment of such disorders. Prerequisite: CDIS 3223.

CDIS4253 Neurological Bases of Communication (Fa) A study of the structures and functions of the central and peripheral nervous systems as they relate to human speech, language, and cognition. Prerequisite: CDIS 3213.

CDIS4263 Advanced Audiology (Fa) Study of the basic techniques used in audiological assessment of children and adults, including pure tone audiometry, speech audiometry, and special tests of hearing function. Prerequisite: CDIS 3103.

CDIS4273 Communication Behavior and Aging (Fa) Study of the effects upon communication of normal aspects of the aging process, from early adulthood throughout the the lifespan. Changes in speech, language, and hearing functioning are identified; common alterations in communicative disorders commonly associated with advanced age are discussed.
CDIS5102 Research Methodology in Communication Disorders (Su) An examination of methods of research in speech-language pathology and audiology and of the use of bibliographic tools. Focuses on purposes and problems of various forms of communication disorders research, procedures and instruments employed, and reporting of research. Prerequisite: graduate standing.
CDIS5112 Seminar in Early Intervention (Fa) Study of a family-centered, transdisciplinary approach to early intervention with infants and toddlers at-risk for communication disorders. Topics include early communication development, service delivery in a family context, coordination with other disciplines, and legislation mandating services. Prerequisite: CDIS 3223 or equivalent, and graduate standing.
CDIS5121 Feeding and Swallowing Disorders Lab (Fa) Observation and interpretation of techniques used for assessment and remediation of feeding and swallowing disorders in children and adults. Corequisite: CDIS 5122. Prerequisite: CDIS 3213 and graduate standing.
CDIS5122 Feeding and Swallowing Disorders (Fa) Study of the etiology, assessment, and remediation of feeding and swallowing disorders in children and adults. Prerequisite: CDIS 3213 or equivalent, and graduate standing.
CDIS5133 Discourse Analysis and Treatment (Fa) (Formerly CDIS 5132, First Offered Summer 2004) Study of discourse behaviors and discourse analysis procedures appropriate for communicatively disordered children and adults, along with review of management approaches associated with impaired discourse performance. Prerequisite: previous course work in language process and disorders, and graduate standing.
CDIS5143 Cognitive-Communication Development and Disorders (Fa) Study of normal cognitive development, the role of communication in this development, and shifts that may occur in conjunction with various speech, language and/or hearing disorders. Prerequisite: CDIS 3223.
CDIS5163 Seminar in Language Topics (Sp, Su, Fa) Study of selected topics in normal and disordered language acquisition and/or language use. Implications of current research are reviewed and applied to evaluation and management of language impairment(s). Prerequisite: graduate standing.
CDIS5173 Survey of Disorders of Communication (Su) Cause and therapeutic principles of speech disorders, including articulatory defects, voice disorders, stuttering and defects due to hearing deficiency. Offered for non-majors in communicative disorders-not open to those who have had CDIS 2253. Prerequisite: graduate standing.
CDIS5193 Seminar in Problems of Oral Communication (Sp, Su, Fa) Investigation of research in selected problems of oral communication; recent developments in speech-language pathology and audiology; individual problems for investigation. Prerequisite: graduate standing.
CDIS5214 Voice and Resonance Disorders (Su) Study of disorders of phonation and resonation, including etiologies, diagnosis, and intervention strategies. Prerequisite: graduate standing.
CDIS5222 Fluency Disorders (Fa) Speech disfluency, including theoretical etiological assumptions and management consideration. Prerequisite: graduate standing.
CDIS5232 Seminar in Misarticulation (Sp) Etiology, diagnosis and treatment of disorders of speech articulation. Prerequisite: graduate standing.
CDIS5244 Language Disorders in Adults (Sp) Cognitive and communicative breakdown due to neurological trauma, including etiology, characteristics, assessment and treatment for aphasia, traumatic brain injury, and right hemisphere disorders. Prerequisite: graduate standing.
CDIS5253 Motor Speech Disorders (Sp) Study of motor speech production disorders related to damage to central or peripheral nervous system motor centers and pathways. Cerebral palsy, adult dysarthria, apraxia, and dysphagia are emphasized. Both theoretical and treatment considerations are addressed. Prerequisite: CDIS 4253 or equivalent, and graduate standing.
CDIS5262 Seminar in Hearing Disorders (Su) Study of selected topics related to hearing assessment and disorders. Topics selected to be relevant to practice of speech-language pathology and other disciplines. Prerequisite: graduate standing.
CDIS5273 Language, Learning and Literacy (Su) An examination of language-based literacy skills, including consideration of development, disorders, assessment and intervention.
CDIS528V ADV CP: Speech-Language (Sp, Su, Fa) (1-6)
CDIS5293 Augmentative and Alternative Communication (Fa) Approaches to communication management with the severely and profoundly handicapped child or adult, with primary emphasis on augmentative and alternative communication assessment and intervention. Prerequisite: graduate standing.
CDIS5381 Diagnostic Practicum (Sp, Su, Fa) Practicum activities in speech-language assessment. Prerequisite: graduate standing.
CDIS5391 Clinical Practicum: Hearing Disorders (Sp, Su, Fa) Practicum in audiology.
CDIS548V Off-Campus Practicum: Public School Site (Sp, Fa) (1-6) Practicum activities in speech-language disorders in a public school setting. Prerequisite: graduate standing.
CDIS558V Internship: Clinical Site (Sp, Su, Fa) (3-6) Field placement in approved clinical setting for clock hours in speech-language pathology assessment and treatment. Students in the master's program must enroll in a minimum of 3 credit hours of CDIS 558V or CDIS 578V during their last semester of graduate studies. Prerequisite: graduate standing; completion of other required practicum courses. May be repeated for 6 hours.
CDIS568V Off-Campus Practicum: Clinical Site (Sp, Su, Fa) (1-6) Practicum activities in speech-language disorders in an off-campus clinical site. Prerequisite: graduate standing; completion of at least 2 semesters of CDIS 528V.
CDIS578V Internship: Public School Site (Sp, Su, Fa) (3-6) Field placement in approved public school setting for clock hours in speech-language pathology assessment and treatment. Students in the Master's program must enroll in a minimum of 3 credit hours of CDIS 578V or CDIS 558V during their last semester of graduate studies. Prerequisite: graduate standing; completion of other required practicum courses.
CDIS590V Special Problems (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.
CDIS599V Seminar in Professional Issues (Sp, Fa) (1-3) Selected topics in professional issues in speech-language pathology and audiology.
CDIS600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CDIS699V Seminar in Communication Sciences and Disorders (Irregular) (1-6) Discussion of pertinent topics and issues in the discipline of communication sciences and disorders. Prerequisite: advanced graduate standing. May be repeated for 18 hours.

COMPARATIVE LITERATURE AND CULTURAL STUDIES (CPLT)

Luis Fernando Restrepo
Director
425 Kimpel Hall
479-575-2951
E-mail: lrestr@uark.edu

Web: http://www.uark.edu/ua/cplt/

Comparative Literature and Cultural Studies Committee:
- Professors Booker, DuVal, Haydar, Pritchett, Ricker
- Associate Professors Arenberg, Fredrick, Kahf, Rosteck, Scheide, Slattery
- Assistant Professors Cohen, Erickson

See affiliated faculty list on the program's web page.

Degrees Conferred:

M.A., Ph.D. (CPLT)

Comparative Literature and Cultural Studies is an interdisciplinary program, dedicated to the study of literature and culture from a global perspective and across languages, genres, disciplines, nations, and cultures. The program offers advanced academic training in foreign languages, literary translation, comparative literature, and cultural studies.

The program is supported primarily by the Departments of Communication, English, and Foreign Languages. The program also has affiliated faculty members in several programs and departments in the humanities and social sciences, including Anthropology, Area Studies (European, Latin American, Middle East), Art, Classics, Drama, Gender Studies, Geography, History, Music, Philosophy, and Sociology.

Areas of Concentration: Master of Arts – Arabic, classics, cultural studies, English, French, German, and Spanish. Doctor of Philosophy – Comparative literature, modern language, cultural studies, literary translation.

Prerequisites to Degree Program: The normal preparation for graduate study in comparative literature and cultural studies is an undergraduate or masters degree in English or foreign languages and literatures. Applicants should have advanced proficiency in at least one foreign language. The program may also accept students with undergraduate or master's degree in the humanities, the social sciences, and other relevant fields under the condition that any deficiencies in literature or foreign languages be completed in addition to the requirements for the degree.

Admission Requirements:

The following materials must be submitted to the Director of the Comparative Literature and Cultural Studies program:

1. Application for Admission to Graduate Study in Comparative Literature and Cultural Studies. The form is available from the Program Director and the program's web page.

2. Admission to the University of Arkansas Graduate School.
3. Graduate Record Examination (GRE) scores on the Aptitude Test (verbal, quantitative, and analytical writing).
4. International students are required to take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exams, meeting the minimum score required by the Graduate School.
5. Complete official transcripts of all undergraduate and graduate work.
6. Three letters of recommendation from former teachers, employers, or supervisors.
7. An examination paper from a literature course, including essay answers, or a term paper or other evidence of writing ability.
8. Statement of purpose describing academic interests and professional goals. Doctoral applicants must specify which track they wish to pursue: comparative literature, modern languages, cultural studies or translation.

Requirements for the Master of Arts Degree: The candidate must take a minimum of 36 hours of graduate courses in Arabic, classics, English, French, German, Spanish and in other disciplines in the humanities and the social sciences, under the following guidelines:

1. A minimum of 12 hours must be taken in each of two of the following language areas: Arabic, Classics, English, French, German, Spanish or other languages offered by the Department of Foreign Languages.
2. A minimum of six hours must be taken in courses that deal with the literatures of several language groups.
3. All courses selected must be approved by the adviser, who will consult with the other members of the Master's Program Advisory Committee.
4. WLIT 5193, Introduction to Comparative Literature, is required of all candidates.
5. COMM 5503, Communication and Cultural Studies, is required of all CPLTMA students.
6. Each master's degree candidate is required to take a comprehensive examination.

Requirements for the Doctor of Philosophy Degree: The doctoral program in comparative literature and cultural studies is designed so that it may be based upon a Master of Arts in Comparative Literature, Cultural Studies, Communication, Arabic, English, French, German, Spanish or other languages or upon the Master of Fine Arts in Translation. Applicants with masters' degrees in the humanities and the social sciences may also be accepted into the program, but will be required to fulfill any deficiencies that the advisor and the Ph.D. Program Advisory Committee identifies. In addition to meeting hour and distribution requirements in one of the concentrations listed below, during the first year of study, the student must declare which doctoral track they will pursue (comparative literature, modern languages, cultural studies or translation), and select a field, period, or genre specialization to support the dissertation (e.g., the epic tradition, postmodern cinema, Renaissance poetry, theoretical issues in translation). The program of study for each student, including administration of candidacy examinations and the satisfaction of all requirements of the Graduate School, will be designed, approved, and supervised by the Program Advisory Committee, which will consist of the Program Director, who will serve as the primary advisor, and at least two other faculty members drawn from the student's areas of specialization.

The following specific requirements must be met by all Ph.D. degree candidates in Comparative Literature and Cultural Studies:

1. Candidates must take a minimum of 66 hours of graduate course work (including credit taken for the M.A. or M.F.A) and must attain a 3.00 grade-point average in each of their fields. Part or all of the graduate course work completed at other U.S. institutions or abroad with a grade of "B" or higher may count towards the 66 hours requirement with the approval of the Program Advisory Committee. However, it should be noted that this course work will not be reflected on the student's transcript.

2. All candidates are required to take a minimum of 18 dissertation hours.

3. WLIT 5193 Introduction to Comparative Literature is required of all candidates.

4. A literary or cultural theory seminar is required of all candidates.

5. Each Ph.D. degree candidate is required to pass the following candidacy examination:

   a. A written examination on specific topics within the student's fields, approved jointly by the student and the Advisory Committee.

   b. An oral examination to discuss strengths, weaknesses, or omissions in the written exam. Students may retake only once any examination they fail.

6. Upon successfully completing the candidacy examination, each student must submit a dissertation proposal to be discussed and approved in a formal meeting with the student's dissertation committee.

7. Within the time limits specified by the Graduate School, each student must submit a dissertation acceptable to the student's dissertation committee.

8. Each student must pass a dissertation defense administered by the student's dissertation committee.

Comparative Literature Concentration: A candidate will prepare three literary fields, one of which will be world literature; the others will be drawn from Arabic, English, French, German, Spanish, Classics or other languages. A minimum of 24 hours must be taken in one field, a minimum of 18 in the second, and a minimum of 15 in the third. Courses may be substituted from related fields with program approval. The M.A. will typically be in comparative literature. Each student must demonstrate fluency in at least one language other than English and a reading knowledge of a second foreign language.

Modern Language Concentration: A candidate will prepare two fields, one of which will be English, French, German, or Spanish. The second field may be English (if not selected as the first field) or a second foreign language (Arabic, French, German, or Spanish). The candidate's Master of Arts will typically be in English, French, German, or Spanish. Students with a Master of Arts in these and other languages from other U.S. universities or from programs abroad may also be admitted into the Modern Language Concentration. In such cases, the program committee will evaluate the candidate's academic record, accept part or all of the course work completed elsewhere, and assign any deficiencies that the committee identifies. However, it should be noted that course work taken elsewhere will not be listed on the students U of A transcript. A minimum of 36 hours must be taken in the first field, a minimum of 24 in the second. Up to 12 hours of relevant world literature or related courses may be applied to either or both fields with program approval. Each student must demonstrate fluency in two languages other than English.

Cultural Studies Concentration: A student will prepare two fields. The first field will be in language and literary studies in a particular tradition (Arabic, Classics, English, French, German, Spanish, or other languages and literatures). The second field of concentration will be developed according to the candidate's interest and disciplinary background, with the approval of the adviser and the doctoral advisory committee. The second field of concentration may be a pre-approved particular cultural studies subject (i.e. gender studies, popular and mass culture, ethnic studies, international film or visual cultures); a geographical region (i.e. Africa, Asia, Latin America, Middle East, Europe); a historical or cultural period (i.e. Medieval, Renaissance, 20th century); or a particular discipline (i.e.

Philosophy, Cultural Anthropology, Sociology, Musicology). As core courses of the second field, COMM 5503 "Communication and Cultural Studies" and the seminar COMM 5993 "Readings in Cultural Studies" are required. Applicants should have a Master's of Arts in Comparative Literature, Cultural Studies, English, Foreign Languages or a field in the Humanities or the Social Sciences. A minimum of 30 hours must be taken in each of the two fields. Each student must demonstrate fluency in at least one language other than English.

Literary Translation Concentration: A student will prepare three fields. A minimum of 36 hours will be taken in Arabic, French, German, Spanish or other languages for the first field; a minimum of 9 hours will be taken in translation workshops (ENGL 5043) for the second field; and a minimum of 12 hours drawn from courses on the form and theory of translation, poetry, and fiction (ENGL 5223, ENGL 5263, ENGL 5273, ENGL 5283, ENGL 5293) for the third. Courses may be substituted from related fields with program approval. The M.A. will typically be in Arabic, French, German, Spanish, or other languages and literatures. Each student must demonstrate fluency in at least one language other than English and a reading knowledge of a second foreign language.

World Literature (WLIT)

WLIT4123 Survey of Russian Literature from Its Beginning to the 1917 Revolution (Irregular) The instructor will discuss the historical and cultural backgrounds while focusing on major writers and will deal with literature as an outlet for social criticism. There will be textual analysis. It will be taught in English. (Same as RUSS 4123)

WLIT4133 Survey of Russian Literature Since the 1917 Revolution (Irregular) The instructor will discuss the historical and cultural backgrounds while focusing on major writers and will deal with literature as an outlet for social criticism. There will be textual analysis. It will be taught in English with readings in English. (Same as RUSS 4133)

WLIT4273 Literature of India and the Near East (Irregular) Leading works and genres of the ancient civilizations, the Moslem world and India, and their contribution to the Western literary tradition.

WLIT4293 Literature of China and Japan (Irregular) Survey of the literary works of the Far East, and of its contribution to the Western Tradition.

WLIT4913 Literary Reflections of the Holocaust (Irregular) Drawing on fiction, poetry, autobiography, and drama from works written originally in French, Polish, German, Dutch, English, and Yiddish, this course introduces students to the Holocaust through literature. Deals with the adequacy of imaginative literature in the face of atrocity, the comparative effectiveness of fiction versus autobiography, and the dangers of exploitation and trivialization. (Same as HUMN 4913)

WLIT4923 Modern World Drama (Irregular) Drama from Ibsen to the 1930s. (Same as ENGL 4923)

WLIT4963 Contemporary World Drama (Irregular) Drama since the 1930s. (Same as ENGL 4963)

WLIT4993 African Literature (Irregular) A study of modern African fiction, drama, poetry, and film from various parts of Africa in their cultural context. Works are in English or English translation. (Same as ENGL 4253)

WLIT5193 Introduction to Comparative Literature (Irregular) Literary theory, genres, movements, and influences. Prerequisite: WLIT 1113. (Same as ENGL 5193)

WLIT5233 Form and Theory of Translation (Irregular) An examination of the principal challenges that confront translators of literature, including the recreation of style, dialect, ambiguities, and formal poetry; vertical translation; translation where multiple manuscripts exist; and the question of how literal a translation should be. (Same as ENGL 5233)

WLIT5483 Germanic and Celtic Backgrounds of Medieval Literature (Irregular) Literary traditions of Old and Middle English, of Germany, Ireland, Scandinavia, and Wales. (Same as ENGL 5483)

WLIT5593 The Renaissance (Irregular) Italian forms and writers of the late 15th and 16th centuries and the spread of the Renaissance tradition in Spain, Portugal, France, and Northern Europe up to 1660.

WLIT5623 The Bible as Literature (Irregular) The several translations of the Bible; its qualities as great literature; its influence upon literature in English; types of literary forms. (Same as ENGL 5623)

WLIT5793 The Enlightenment (Irregular) Literature of the late 17th and 18th centuries, especially in France and Germany.

WLIT5963 Twentieth-Century Continental Novel (Irregular) Survey of the continental novel from 1900 to the present.

WLIT600V Master's Thesis (Sp, Su, Fa) (1-6)

WLIT603V Special Studies in Comparative Literature (Irregular) (1-6) May be repeated for 6 hours.

WLIT6703 Psychoanalysis and Culture (Irregular) Readings of key tests in Psychoanalytic thought and cultural criticism including Freud, Lacan, Kristeva, Certeau, Zizek, and others. Selections of Psychoanalytic approaches to literature, film and gender and trauma studies.

WLIT6803 Postcolonial Theory and Subaltern Studies (Irregular) Seminar examining the geopolitical (imperial, colonial and national) implications of knowledge and culture. Selected readings of early postcolonial texts by Cesaire, Fanon, Fernandez Retamar as well as more recent texts by Said, Spivak, Bhabha, Mignolo, Beverly and Chakrabarty among others. May be repeated for 6 hours.

WLIT690V Seminar (Irregular) (1-6) May be repeated for 6 hours.

WLIT699V Master of Fine Arts in Translation Thesis (Sp, Su, Fa) (1-6)

WLIT700V Doctoral Dissertation (Sp, Su, Fa) (1-12)

COMPUTER SCIENCE AND COMPUTER ENGINEERING (CSCE)

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- Distinguished Professor Yeargan
- Professors Crisp, Deaton, Skeith, Thompson (C.)
- Associate Professors Apon, Beavers, Li, Lusth, Panda, Parkerson, Thompson (D.)
- Assistant Professors Di, Hexmoor
- Instructor Baker

Degrees Conferred:
M.S., Ph.D. in Computer Science (CSCE)
M.S.Cmp.E. in Computer Engineering (CENG)
M.S.E., Ph.D. in Engineering (ENGR) (See Engineering)

Primary Areas of Faculty Research: Distributed computer systems and networks, cluster computing, theory of computation, artificial intelligence, database, molecular computing and software for network applications, multiagent systems, VLSI system design, logic circuits, combinatorial optimization, design and analysis of algorithms, computer security, digital forensics, ASIC, digital electronics, computer architecture, telecommunications, large computer simulation.

Computer Engineering (CENG)

Prerequisite to Degree Programs: Applicants should have completed the equivalent of a Bachelor of Science degree in computer engineering at an accredited college or university. An applicant must also present scores on the General Test of the Graduate Records Examination (GRE).

Departmental Requirements: In addition to the requirements of the Graduate School and the College of Engineering, the candidates for the master's in Computer Engineering must satisfy the following departmental requirements:

The course work must include the two courses designated as core computer engineering courses by the Department of Computer Science & Computer Engineering. The following two core classes must be taken for either option – CENG 5093 Fault-Tolerant Systems Design and CENG 5983 ASIC Design. In addition to the core classes, at least four technical electives must be taken from the following list: CENG 4223 Digital Circuit Testing, CENG 4233 Low Power Digital Systems, CENG 4533 Object-Oriented Programming and Design, CENG 4753 Computer Networks, CENG 4953

Minicomputer Applications, CENG 5633 Network Performance, CENG 5613 Introduction to Telecommunications, CENG 5903 Advanced Computer Architecture, CENG 5933 CAD Methods for VLSI, or CENG5943 Computer Arithmetic Circuits.

The remaining classes (6 credit hours for the thesis option or 12 credit hours for the project option) may be taken within the CSCE Department (CENG or CSCE prefixed graduate classes) and/or from outside the department subject to the approval of the candidate's graduate committee. Note that not more than 9 credit hours can be taken from outside the department.

Option I: (30 hours)

1. Candidates are required to present a thesis in the computer engineering discipline and complete a minimum of 24 semester hours of course work (the core and elective courses) and six semester hours of thesis credit.
2. Course work presented must include a minimum of 12 semester hours at the 5000-6000 level in Computer Science and Computer Engineering.
3. Any course work taken at the 4000-level must be approved for graduate credit, or approved by the Graduate Dean, and must be offered by the Department of Computer Science and Computer Engineering.

Option II: (33 hours)

1. Candidates are required to complete a minimum of 30 semester hours of course work (the core and elective courses) plus a three-hour technical project with report in the computer engineering discipline (CENG 581V).
2. Course work presented must include a minimum of 15 hours at the 5000-6000 level in Computer Science and Computer Engineering.
3. Any course work taken at the 4000-level must be approved for graduate credit, or approved by the Graduate Dean, and must be offered by the Department of Computer Science and Computer Engineering.

The program of study for each candidate will be determined by conference with the major professor and with advice from the candidate's advisory/thesis committee.

The final exam is comprehensive; a portion of the exam will be devoted to questions concerning courses completed by the student. Another portion of the exam will be directed toward a defense of the thesis, if one is written as part of the program, or an explanation and discussion of the report resulting from a non-thesis option. In either case, reading copies of the thesis or report should be delivered to members of the Program of Study Committee at least two weeks prior to undertaking the final examination. Successful completion of the final oral examination is a requirement for the Master of Science degree. If a student is unsuccessful, the Program of Study Committee may recommend that the examination be repeated. If so, the requirements to be satisfied prior to reexamination will be stipulated and a time limitation specified.

Requirements for the Doctor of Philosophy Degree: (See Engineering)

Computer Engineering (CENG)

CENG4113 Embedded Systems (Irregular) The architecture, software, and hardware of embedded systems. Involves a mixture of hardware and software for the control of a system (including electrical, electro-mechanical, and electro-chemical systems). They are found in a variety of products including cars, VCRs, HDTVs, cell phones, pacemakers, spacecraft, missile systems, and robots for factory automation. Corequisite: Drill component. Prerequisite: CENG 2123 and CENG 2133.

CENG4213 Introduction to Computer Architecture (Sp) Design of a single board computer including basic computer organization, memory subsystem design, peripheral interfacing, DMA control, interrupt control, and bus organization. Prerequisite: CENG 2213. (Same as ELEG 4983)

CENG4223 Digital Circuit Testing and Testability (Irregular) The complexity of digital circuits placed on IC chips have significant impact on the cost of tooling such chips. Testing is performed to ensure that function/performance have not been altered during fabrication. This course introduces current testing techniques for digital circuits and to design strategies used to enhance their testability. Prerequisite: CENG 2123.

CENG4233 Low Power Digital Systems (Irregular) The reduction of power consumption is rapidly becoming one of the key issues in digital system design. Traditionally, digital system design has mainly focused on performance and area trade-offs. This course will provide a thorough introduction to digital design for lower consumption at the circuit, logic, and architectural level. Prerequisite: CENG 2123.

CENG4343 Programming Windows and the GUI (Irregular) Introduction to the basic concepts of graphical user interface (GUI) programming using the Microsoft Windows environment. Discussion of design techniques relating to color, size, shape, location, font, etc. Real-world applications will be programmed using Visual Basic, C and C++. Prerequisite: CENG 2143 or CSCE 2143.

CENG4423H Honors Computer Systems Analysis (Irregular) Basic concepts of problem analysis, model design, and simulation experiments. A simulation will be introduced and used in this course. Prerequisite: INEG 3313 or STAT 3013. (Same as CENG 4423)

CENG4423 Computer Systems Analysis (Irregular) Basic concepts of problem analysis, model design, and simulation experiments. A simulation will be introduced and used in this course. Prerequisite: INEG 3313 or STAT 3013 and proficiency in a programming language. (Same as CENG 4423H)

CENG4533 Object Oriented Programming and Design (Fa) Indepth coverage of the methods and techniques of object-oriented design and its applications to database and artificial intelligence. Prerequisite: CENG 3943.

CENG4753 Computer Networks (Fa) This course is an introductory course on computer networks. Using the Internet as a vehicle, this course introduces underlying concepts and principles of modern computer networks, with emphasis on protocols, architectures, and implementation issues. Prerequisite: INEG 3313 or STAT 3013.

CENG4823 Advanced Computer Graphics and Animation (Irregular) Advanced topics in the generation of computer graphics and animation imagery concentrating on non-procedural approaches. Topics include physical modeling, transformations, lighting models, and rendering algorithms. Theoretical issues include the graphics pipeline and rendering equation. Practical issues include the use of industry standard graphics libraries and rendering hardware and efficiency. Prerequisite: CENG 4813.

CENG4883 Introduction to Image Processing (Irregular) Introduction to the basic concepts of image processing; theory and applications. Covers digital methods of image restoration; reformation, extraction and analysis. Prerequisite: CENG 2143 or CSCE 2143.

CENG4953 Minicomputer Applications (Irregular) Structure, implementation, and application of minicomputer systems, microcomputer hardware, microprogramming, minicomputer software technology, and design and evaluation of minicomputer systems. Prerequisite: CENG 3943.

CENG5013 Topics in Computer Hardware (Irregular) Advanced features of computer hardware. Topics include: memory design, input and output design, direct memory access techniques, and electro-optical signal conversion and EPROM applications. Corequisite: Lab component. Prerequisite: CENG 4213 or equivalent and graduate standing.

CENG5023 SOFTWARE ENGINEERING I (IR) A study of design and development used in software and computer systems engineering. Topics include project planning, requirements analysis, software design fundamentals, quality assurance, and software testing and maintenance. Prerequisite: graduate standing.

CENG5033 Software Engineering II (Irregular) A study in software project design and management. The class defines and develops a semester project carrying out the planning, requirements analysis, software and systems design quality assurance, as well as software testing and maintenance. Prerequisite: CENG 5023.

CENG5043 Real-Time Operating Systems (irregular) A study and implementation of a real-time operating system for process control applications using a single board microprocessor system. Prerequisite: graduate standing.

CENG5083 Digital Circuit Design Verification (Irregular) A study of the principles of formal verification as an alternative to simulation and testing in the elimination of logical design errors in digital systems. Prerequisite: CENG 2123 and graduate standing.

CENG5093 Fault-Tolerant System Design (Irregular) Fault-tolerance is concerned with making or recovering from the effects of faults in a digital system, once they have been detected. On-line fault detection is often required before the fault recovery process. This course will familiarize students with currently available techniques for self-checking and fault-tolerant digital system design. Prerequisite: graduate standing.

CENG510V Special Problems (Irregular) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

CENG5153 Real-Time Data Acquisition Systems (Irregular) The theory and practice associated with taking measurements of the real world for use with computers. Sampling and data analysis techniques. Prerequisite: graduate standing.

CENG5213 Interactive Computer Graphics (Irregular) Basic concepts involved in the generation and display of computer graphics. Topics include graphics hardware, transformations, modeling, and device independent graphics. Prerequisite: working knowledge of a programming language.

CENG5333 Knowledge-Based Systems (Irregular) Expert systems, structured knowledge representation, and rule-based inference systems. Prerequisite: graduate standing.

CENG5613 Introduction to Telecommunications (Fa) Overview of public and private telecommunication systems, traffic engineering, communications systems basics, information technology, electromagnetics, and data transmission (same as ELEG 5613). Prerequisite: graduate standing. (Same as ELEG 5613)

CENG5633 Network Performance Evaluation (Irregular) A study of performance modeling tools for telecommunication networks, computer networks, and wireless networks. Prerequisite: STAT 3013 or equivalent and graduate standing.

CENG5643 Computer Communications Networks (Irregular) A study of computer communication networks, including the data link layer, routing, flow-control, local area networks, TCP/IP, ATM, B-ISDN, queueing analysis, and recent developments in computer

communications. Prerequisite: graduate standing.
CENG5653 Network Security (Sp) This course introduces security and secrecy in a networked environment. It is intended to familiarize students with the elements of secure communication, and how they inter-relate to provide secure networks in public and private settings. Prerequisite: graduate standing.
CENG5683 Image Processing (Irregular) Concepts involved in the processing of digital images. Emphasis on image analysis, enhancement, and restoration. Both spatial and frequency domain approaches are presented. Prerequisite: graduate standing and working knowledge of statistics and a programming language.
CENG5801 Seminar (Sp, Fa) Oral presentations given by graduate students on subjects dealing with current topics in computer engineering and computer science. Prerequisite: graduate standing.
CENG581V Master's Research Project and Report (Sp, Su, Fa) (1-6) Required course for report option. Prerequisite: graduate standing.
CENG5903 Advanced Computer Architecture (Irregular) A study of advanced architectural techniques employed in modern, general-purpose computers with emphasis on uniprocessor systems, uniprocessor topics; support for instruction-level parallalism (branch prediction, multiple instruction issue, speculative execution, compiler optimizations for ILP), advanced memory system design, high-performance I/O. Multiprocessor topics: cache coherence protocols, memory consistency models, synchronization mechanisms. Prerequisite: CENG 4213 or equivalent and graduate standing.
CENG5913 Advanced Compilers (Irregular) Compiler issues are discussed with regards to contemporary languages and architectures. Such topics as flow analysis, optimization, code scheduling, parallelism, and memory use will be covered. Prerequisite: graduate standing.
CENG5923 Research Topics in Computer Architecture (Irregular) This course focuses on the design of new high performance central processing units (CPU'S). The design of superscalar, superpipelined, decoupled and multithreaded architectures will be covered. Course materials will be drawn from literature, and will represent the current state of the art. Prerequisite: CENG 4213 or equivalent and graduate standing.
CENG5933 CAD Methods for VLSI (Irregular) Introduction to computational methods for the design and implementation of computer aided design (CAD) tools for digital systems engineering. The underlying theory of the tools is emphasized in addition to their application. Prerequisite: proficiency using a modern high-level programming language and CENG 4213.
CENG5943 Computer Arithmetic Circuits (Irregular) Examination of fundamental principles of algorithms for performing arithmetic operations in computers. This course provides sufficient theoretical and practical information to prepare the digital design engineer with an awareness of basic techniques for the realization of arithmetic circuits. Pre- or Corequisite: graduate standing.
CENG5963 Computer Systems Optimization (Irregular) Design considerations and performance analysis of computer and communication systems modeling. Prerequisite: graduate standing.
CENG5973 Advanced Embedded Systems Design (Irregular) A theoretical and practical study of computing systems embedded in mechanical, electrical and electronic controls such as those to control automobiles, airplanes, appliances, and communication systems. Prerequisite: CENG 4113 or equivalent or graduate standing.
CENG5983 Application Specific Integrated Circuit Design (Irregular) ASIC design is taught with emphasis on industrial preparation. Topics include ASIC technologies, design entry, simulation, and synthesis. Advanced design methods and techniques are studied for cell based and gate array ASICs. Prerequisite: CENG 4213 or ELEG 4943.
CENG610V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CENG700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

Computer Science (CSCE)

Prerequisites to Degree Programs: Applicants should have completed the equivalent of a Bachelor of Science degree in computer science following the most recent guidelines published by the Association for Computing Machinery and the IEEE Computer Society. An applicant must present scores on the General Test of the Graduate Record Examinations (GRE).

Requirements for the Master of Science Degree: The non-thesis option for the degree requires the successful completion of at least three semester hours of CSCE 620V Research in Computer Science, plus 30 semester hours of computer science courses approved by the candidate's graduate committee. At most, nine of the 30 semester hours may be other than CSCE or CENG courses. The thesis option for the degree requires the successful completion of at least six semester hours of CSCE 610V Master's Thesis, plus 24 semester hours of computer science courses approved by the candidate's graduate committee; at most, nine of the 24 semester hours may be other than CSCE or CENG courses.

All candidates must pass an oral examination and defense of the project report or thesis in, at most, two attempts. The first attempt may not occur before all of the following qualifying conditions have been satisfied:

1. Candidates must have completed at least 21 hours that are applicable toward the degree. Candidates following the thesis option must be currently enrolled in CSCE 610V and those following the non-thesis option must be currently enrolled in, or have completed, CSCE 620V.
2. The courses CSCE 5033 Design and Analysis of Algorithms and CSCE 5313 Advanced Operating Systems – designated core courses, have been completed.
3. The candidate's cumulative grade-point average on all graduate-level courses must be 3.00 or higher.

Requirements for the Doctor of Philosophy Degree: In addition to the requirements of the Graduate School, the following departmental requirements must be satisfied by candidates for a Doctor of Philosophy degree with a major in computer science.

Complete a minimum of 54 semester credit hours of graduate level course work (at the 5000- or 6000-level) beyond a bachelor's degree, of which 24 hours must be beyond any coursework used to fulfill requirements for a master's degree.

The coursework must include all courses designated as core computer science courses by the Department of Computer Science and Computer Engineering. Courses that currently carry this designation are CSCE 5033 Design and Analysis of Algorithms and CSCE 5313 Advanced Operating Systems.

A student is admitted to candidacy by first passing a Ph.D. Qualifying Examination and then, at a later time, a Candidacy Examination on the student's dissertation proposal. The Ph.D. Qualifying Examination must be passed no later than the end of the first year of study for students admitted to the program with a master's degree and no later than the end of the third year for students admitted to the program without a master's degree. The Qualifying Examination is scored Pass or Fail on each of the four sections of the examination. If a Fail is assigned on any section of the examination, then the student must repeat that section at the next administration of the examination. A second failure will terminate the student's course of study in the computer science doctoral program. In preparation for the Ph.D. Qualifying Examination, a student should refer to the CSCE Graduate Student Handbook.

Each student must form a doctoral supervisory committee before registering for dissertation hours. This committee must consist of faculty who hold qualifying status on the graduate faculty, the majority and chair of which hold regular or adjunct appointments in the Department of Computer Science and Computer Engineering.

For the Candidacy Examination, the student is expected to present a dissertation proposal with a list of goals and a plan of action to accomplish them. Committee members will judge the goals on their scientific merit, originality, and difficulty. Each Ph.D. student will be expected to defend a completed dissertation before his or her dissertation committee.

The doctoral program must include a minimum of 18 hours of CSCE 700V Doctoral Dissertation in addition to the coursework specified above.

Computer Sci/Computer Engr (CSCE)

CSCE5003 Advanced Programming Languages (Irregular) Abstraction, proof of correctness, functional languages, concurrent programming, exception handling, dataflow and object oriented programming, denotational semantics. Prerequisite: graduate standing.
CSCE5023 Architecture of Computer Systems (Irregular) An advanced study of both classical and recent computer hardware and software systems. Prerequisite: graduate standing.
CSCE5033 Design and Analysis of Algorithms (Sp) Design of computer algorithms, with primary emphasis on the development of efficient implementation. Prerequisite: graduate standing.
CSCE5043 Artificial Intelligence (Irregular) In-depth introduction to AI. Topics include: philosophical foundations, cognition, intelligent agents, AI languages, search, genetic algorithms, first order and modal logic, inference, resolution, knowledge representation, ontologies, problem solving, planning, expert systems, uncertainty, probabilistic reasoning, fuzzy logic, machine learning, natural language processing, machine vision, and robotics.

Prerequisite: graduate standing.
CSCE5123 Database Management Systems (Fa) In-depth introduction to database management systems. Topics include: architecture, schemas, data sources, file structures, indexing, data models (relational, hierarchical, network, entity relationship, object-oriented), query languages, views, relational algebras, SQL, optimization, user interfaces, ODBC, transaction management, concurrency control, recovery, integrity, security, and commercial trends. Prerequisite: CSCE 2143 or CENG 2143 and graduate standing.
CSCE5203 Advanced Database Systems (Sp) Topics include: object databases, distributed databases, XML query, data warehouses, network as database systems, peer-peer data sharing architectures, data grids, data mining, logic foundations, semantic databases, spatial and tempral databases, and knowledge bases. Prerequisite: CSCE 5123 and graduate standing.
CSCE5213 Intorduction to Bioinformatics (Irregular) Application of algorithmic techniques to the analysis and solution of biological problems. Topics include an introduction to molecular biology and recombinant DNA technology, biological sequence comparison, and phylogenetics, as well as topics of current interest. Prerequisite: Instructor consent. (Same as BENG 5213)
CSCE5233 Principles of Compiler Construction (Irregular) Lexical analysis, parsing, symbol table construction, intermediate code generation, run-time simulation. Prerequisite: graduate standing.
CSCE5243 Formal Languages (Fa) An advanced continuation of CSCE 4323. Prerequisite: CSCE 4323 and graduate standing.
CSCE5263 Computational Complexity (Irregular) Turing machines, recursion theory and computability, complexity measures, NP-completeness, analysis on NP-complete problems, pseudo-polynomial and approximation. Prerequisite: graduate standing.
CSCE5283 Graph and Combinatorial Algorithms (Irregular) A study of algorithms for graphs and combinatorics with special attention to computer implementation and runtime efficiency. Prerequisites: graduate standing or instructor consent.
CSCE5303 Parallel Programming (Irregular) An analysis of parallel computer systems with respect to software engineering. Practical programming experience on pipelined, array, and multi-processor computers. Prerequisite: CSCE 4413 or equivalent and graduate standing.
CSCE5313 Advanced Operating Systems (Irregular) Concurrent processes and process communication; mutual exclusion and synchronization principles; kernel philosophy; resource allocation and deadlock; and case studies of specific operating systems. Prerequisite: CSCE 4413 or equivalent and graduate standing.
CSCE5323 Computer Security (Fa) Study of a broad selection of contemporary issues in computer security. Topics include access control, security policies, authentication methods, secure system design, and information assurance. Prerequisite: CSCE 4413.
CSCE5333 Computer Forensics (Sp) Various methods for identification, preservation, and extraction of electronic evidence at a computer crime scene. Specific topics include auditing and investigation of network and host instrusions, computer forensics tools, resources for system administrators and information security officers, legal issues related to computer and network forensics. Prerequisite: CSCE 5323.
CSCE5513 Intelligent Robot Control (Irregular) This course is designed to examine software issues surrounding the creation and control of autonomous robots. Techniques include: genetic programming, artificial neural networks, reinforcement learning, and symbolic methods. Programs are run in simulation and on actual robotic controllers. Topic discussed include visual processing, spatial mapping, and learning. Prerequisite: graduate standing
CSCE5523 Multiagent Systems (IR) Multiagent systems is the study, construction, and application of systems in which several interacting software (or software and human) agents pursue some set of goals or some set of tasks. The course covers agent architectures; multiagent problem-solving and planning; multiagent communication; multiagent search; multiagent learning; reasoning about action, plans, beliefs and knowledge; coordination; cooperation and competition; teamwork; and multiagent decision-making. Application examples are presented in e-commerce, scheduling, robotics, control, information retrieval, manufacturing and logistics.
CSCE5713 Multimedia Systems Design (Irregular) Overview of digital unified multimedia. Programming methodology involved in integration of all forms of digitized information (e.g., text, sound, graphics, animation, and process control) in a single computer-based interactive environment. Prerequisite: graduate standing.
CSCE5723 Client-Server Computing (Irregular) Advanced Object Oriented methods for designing software systems for network applications. Topics include implementations of distributed object models, remote database connectivity. Server side programming, and reusable components. Prerequisite: CSCE 5743 and graduate standing.
CSCE5733 Information Agency (Irregular) Study of software agents and their deployment on the internet: precursors to agents - viruses and worms, origins of software agents, delegate vs. representative agents, agency of the Internet and Web, operational guidelines for agents, HTTP, transaction security, MUD agency, intelligent agency, applications of agents: indexers, resource managers, search utilities, and commercial applications. Prerequisite: graduate standing.
CSCE5743 Object Oriented Programming for the Internet (Irregular) Object oriented design and programming for Internet client/server applications. Basics of the Internet, including TCP/IP protocol stack. Introduction to Object Oriented Programming and Object Oriented Design with Unified Modeling Language. Sockets application programming interface. Graphical user interfaces. Prerequisite: graduate standing.
CSCE590V Advanced Topics in Computer Science (Irregular) (1-3) Topics not covered in depth in other courses. Prerequisite: graduate standing. May be repeated for 3 hours.
CSCE5953 Real-time Systems (Irregular) A study of real-time system design. The development of real-time systems will be examined from the standpoint of academia, government, and industry. Scheduling, operating systems, and architecture considerations are among other topics to be covered. Prerequisite: graduate standing.
CSCE610V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CSCE620V Research in Computer Science (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.
CSCE690V Graduate Seminar (Irregular) (1-6) Concentrated study in selected areas of computer science research. Prerequisite: advanced graduate standing May be repeated for 12 hours.
CSCE700V Doctoral Dissertation (Sp, Su, Fa) (1-18) May be repeated for 5 hours.

COUNSELOR EDUCATION (CNED)

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- Associate Professor Newgent
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- Instructor Stephen

Degrees Conferred:

M.S. in Counseling (CNSL)
Ed.S. (EDUC)
Ph.D. (CNED)

The Counselor Education Program has three programs accredited by the Council for Accreditation of Counseling and Related Education Programs (CACREP) that prepare professional counselors for elementary and secondary schools, universities, various community agencies, and private practice. Common course requirements are specified for each emphasis. General requirements for M.S., Ed.S., and Ph.D. applicants are as specified in the Objectives, Regulations, and Degrees section of this catalog. Persons completing degrees in counselor education are eligible to apply for Licensed Professional Counselor through the Board of Examiners in Counseling for the State of Arkansas and/or for various certifications through the State Department of Education and National Board for Certified Counselors. Persons intending to complete school counselor certification requirements for the state of Arkansas must, in addition to the master's degree, meet certain Arkansas Department of Education requirements. The master's degree in School Counseling and Community Counseling, and the doctoral program are CACREP accredited.

Areas of Concentration: Community counseling; college counseling; school counseling.

Primary Areas of Faculty Research: Career counseling; counseling skills and interventions; multicultural and diversity issues; skills training; at-risk children; disenfranchised populations; athletics and academic achievement..

Admission Requirements and Procedures for the Master of Science in Counseling Degree Program: Academic requirements include a 3.00 GPA on all undergraduate and also on any previous graduate course work. Applicants should submit a program application, three letters of professional recommendation, and a statement of professional goals to the Coordinator for Graduate Studies (GRAD 251). Applicants should first submit an application, official transcripts, and official GRE or MAT scores indicating capacity for graduate-level performance to the Graduate School. The applicant

must be accepted by the Graduate School prior to consideration for admission into the Counseling Program. Top applicants will be invited for a personal interview with Counselor Education faculty. Completed application deadlines are October 15 for Spring admission and March 15 for Summer/Fall admission.

Requirements for the Master of Science in Counseling Degree:

Required Core Courses:
CNED 5203 Foundations of the Counseling Profession
CNED 5213 Lifestyle and Career Development
CNED 5303 Individual Appraisal
CNED 5323 Counseling Theory
CNED 5333 Basic Counseling Techniques
CNED 5343 Counseling Practicum
CNED 5363 Dynamics of Group Counseling
CNED 5373 Ethical & Legal Issues in Counseling
CNED 5383 Crisis Intervention Counseling
CNED 5403 Case Management & Counseling
CNED 5513 Counseling and Human Diversity
CNED 6023 Foundations of Marriage and Family Counseling & Therapy
EDFD 5013 Research Methods in Education
EDFD 5573 Life Span Human Development

Emphasis in Community Counseling requires 60 graduate hours including:
CNED 574V Community Counseling Internship (6 semester hours; 600 clock hours in a community setting)
CNED 599V Seminar: Psychoparmacology (3 semester hours)
CNED 599V Seminar: Community Counseling (3 semester hours)
CNED 6003 Counseling and Addictions
CNED 6083 Consultaton Theory and Methods

Emphasis in College Counseling requires 54 graduate hours including the following:
HIED 5003 Overview- American Higher Education
HIED 5033 College Students and Student Personnel Services
CNED 574V College Counseling Internship (6 semester hours; 600 clock hours in a college setting)

Emphasis in School Counseling requires 54 graduate hours including the following:
CNED 5313 Program Organization and Information Management
CNED 574V School Counseling Internship (6 semester hours; 600 clock hours in a school setting)
CNED 6093 Counseling Children and Adolescents

Admission Requirements and Procedures for the Educational Specialist Degree: This program is indefinitely suspending applications until further notice

Admission Requirements and Procedures for the Doctor of Philosophy Degree: Applicants for the doctoral program in counselor education may obtain an application packet from the counselor education Web site: http://cned.uark.edu.

Doctoral applicants must:
1. Have a completed master's degree in counseling or its equivalent in areas specified by the Council for Accreditation of Counseling and Related Education Programs (CACREP), and preferably one year post-master's professional counseling experience or the equivalent.
2. Apply to the Graduate School.
3. Submit official transcripts reflecting a minimum 3.5 GPA on all previous graduate work.
4. Submit official GRE scores indicating capacity for doctoral-level performance.
5. Submit three letters of recommendation indicating capacity for advanced graduate study.
6. Submit an autobiographical sketch.
7. Top applicants will be invited for a formal interview with the counselor education faculty.
8. All applicants must be accepted by the Graduate School prior to consideration for admission into the Counseling Program.
9. Complete applications are due October 15 for Spring admission and March 15 for Summer/Fall admission.

Requirements for the Doctor of Philosophy Degree: Candidates for the Doctor of Philosophy in counselor education must meet the requirements for the applicable degree in the Objectives, Regulations, and Degrees section of this catalog and complete a minimum of 98 semester hours of graduate study acceptable to their doctoral advisory committee.

Counselor Education Core Courses:
CNED 6013 Advanced Counseling Theory and Methods
CNED 6033 Advanced Group Theory and Methods
CNED 6043 Supervision of Counselors
CNED 6073 Research in Counseling
CNED 6083 Consultation Theory and Methods
CNED 6123 Clinical Applications of Marriage and Family Counseling & Therapy
CNED 6413 Advanced Individual Appraisal
CNED 6523 Gender Issues In Counseling and Human Development
CNED 6711 Advanced Practicum
CNED 674V Clincial Internship/Instructorship/Supervision/ Research (9-12 hours)
CNED 699V Seminar (2-4 credit hours).
CNED 700V Dissertation (18 credit hours minimum)

Plus three courses from either of the following focus areas based upon career goals:
Clinical Focus:
CNED 6063 Counseling and Sexuality
CNED 6093 Counseling Children and Adolescents
CNED 6003 Counseling and Addictions
Professors/Academic Focus:
HIED 6013 The Professoriate: Problems and Issues
HIED 6323 Design and Evaluation of College Teaching
HIED 6343 Strategies for Effective College Teaching

Cognate Requirement:

Doctoral candidates must complete additional cognate area study related to the candidate's intended specialty in the counseling profession; nine hours (with advisory committeee approval). Six hours of courses must be at the 6000 level.

College of Education Requirements:

Dissertation (listed above), research and statistics (18 semester hours), graduate transfer credits (36 semester hours maximum). Additionally, there is a six-hour "foreign language requirement." To meet this requirement, it is suggested that a student (1) take or show mastery of a foreign language or (2) take six hours of computer technology.

Doctoral Portfolio

Portfolios are to be developd with the guidance and approval of the doctoral advisory committeee and are due at the time of the student's oral comprehensive examination.

Counselor Education (CNED)

CNED5203 Foundations of the Counseling Profession (Sp, Fa) A study of the counseling profession applicable to school, college and community agency settings. Introduction to the basic educational, historical, philosophical foundations of counseling as well as specific traits and skills of counselors. The course is also designed to provide beginning level concepts and skills required for certification and licensure. Prerequisite: Must be taken first year in program.

CNED5213 Lifestyle & Career Development (Sp,Fa) Theories of career development and counseling, including the use of occupational information sources and career assessment tools and techniques. Prerequisite: CNED 5333 (preferred)

CNED5303 Individual Appraisal (Su, Fa) Analysis of concepts, methods, and procedures utilized in individual appraisal.

CNED5313 Program Organization and Information Management (FA) Study of client information needs and strategies for effective management of counseling services.

CNED5323 Counseling Theory (FA, SU) Introductory survey and critical analysis of major alternative theoretical perspectives in counseling.

CNED5333 Basic Counseling Techniques (FA, SP) Introduction to basic counseling techniques and skills common to multiple theoretical perspectives.

CNED5343 Counseling Practicum (Sp, Fa) Supervised counseling practice. Pre or Co requisite: CEND 5303 and CNED 5363 and CNED 5373. Prerequisite: CNED 5203, CNED 5323, CNED 5333, CNED 5403. CNED Faculty consent required.

CNED5363 Dynamics of Group Counseling (FA, SP) Therapeutic and other theoretical information is presented regarding group process and the counselor's role in that process. An experiential group experience is required. Prerequisite: CNED 5333 and CNED 5323.

CNED5373 Ethical and Legal Issues in Counseling (FA) (Formerly CNED 5372) Review of ethical and legal standards governing professional counselor training, research, and counseling practice; including client rights; confidentiality; the client-counselor relationship; and counseling research, training, and supervision. Prerequisite: CNED 5103 and CNED 5203.

CNED5383 Crisis Intervention Counseling (SU) (Formerly CNED 5382) Analysis and application of short-term counseling intervention strategies in crisis situations, with special attention to incidents involving rape, physical, or emotional abuse, divorce, suicidal depression, grief, martial or family instability, and violent conflict. Prerequisite: CNED 5333 (preferred)

CNED5403 Case Management and Counseling (FA) Procedures in case management utilizing both clinical and interview data in assisting children, adolescents, and adults in educational, vocational, personal, and social planning. Prerequisite: CNED 5303 and CNED 5323 and CNED 5333.

CNED5513 Counseling and Human Diversity (SP) Examination of human and cultural diversity, emphasizing issues of race, class, and socioeconomic status, and how they impact our clients as individuals and as family and society members.

CNED574V Counseling Internship (FA, SP) (1-3) A 600-clock-hour field placement in an approved setting over a minimum of two continuous semesters. Co or Prerequisite CNED 5213. Prerequisite: CNED 5203, CNED 5303, CNED 5323, CNED 5333, CNED 5343, CNED 5363, CNED 5373, CNED 5403, CNED 5513 and CNED 6203. CNED Faculty consent required. May be repeated for 6 hours.

CNED599V Seminar (Irregular) (1-6) May be repeated for 6 hours.

CNED6003 Counseling and Addictions (SP) A study of behavioral and substance additions, including an overview of differential treatment. Prerequisite: CNED 5323 and CNED 5333 and CNED Doctoral or Masters Standing or Permission.

CNED600V Master's Thesis (Sp, Su, Fa) (1-6)

CNED6013 Advanced Counseling Theory and Methods (FA, Even Years) Critical analysis of major theoretical perspectives in counseling, including both group and individual counseling strategies for dealing with affective, cognitive, and behavioral dysfunction. Prerequisite: CNED Doctoral Standing or Permission.

CNED6023 Foundations of Marriage and Family Counseling Therapy (SU) Comprehensive exploration of the current theories/techniques of marriage, family and couples counseling. Prerequisite: CNED 5323 and CNED 5333 and CNED Doctoral or Masters Standing or Permission

CNED6033 Advanced Group Theory and Methods (Sp) Comparative study of theories and processes of group counseling. Includes supervised experience in group facilitation with video recording and playback. Prerequisite: CNED 5363 or equivalent and CNED Doctoral Standing or Permission.

CNED6043 Supervision of Counselors (FA, Even Years) Analysis, assessment, and practical application of counselor supervision techniques in treatment and training programs. Prerequisite: CNED Doctoral standing and CNED Faculty consent.

CNED605V Independent Study (Sp, Su, Fa) (1-18) May be repeated for 18 hours.

CNED6063 Counseling and Sexuality (SU, Odd Years) Analysis of theory and practice in issues related to sexual dysphoria, sexuality, and sexual problems. Prerequisite: CNED 574 and CNED Doctoral standing or permission.

CNED6073 Research in Counseling (SP, Odd Years) Review and analysis of research in counseling. Prerequisite: CNED Doctoral standing or permission.

CNED6083 Consultation Theory and Methods (SU) Strategies, practical application, and techniques for effective consultation with parents, teachers, and community agencies. Prerequisite: CNED 5333 (preferred) CNED Doctoral or Masters standing or permission.

CNED6093 Counseling Children and Adolescents (SP) Introduction to counseling children and adolescents including the process, theories, techniques, and materials applicable to children and adolescents in a pluralistic society. Prerequisite: CNED 5323 and CNED 5333 and CNED Doctoral or Masters standing or permission.

CNED6123 Clinical Applications of Marriage and Family Counseling and Therapy (SU, Even Year) Advanced clinical methodology appropriate for family counseling, marriage counseling, and couples counseling(in all settings), with emphasis on solution-focused systems, Satir model and psychoeducational family work in schools. Includes supervision of clinical experience in marriage, family and couples counseling, video recording and school/community outreach. Prerequisite: CNED 6203 and CNED Doctoral standing or Permission.

CNED6413 Advanced Individual Appraisal (FA, Odd Years) To provide advanced knowledge and experience with those psychoeducational instruments and procedures used in conducting school related assessment. Prerequisite: CNED 5303 and CNED 5413 or equivalent and CNED Doctoral standing or permission.

CNED6523 Gender Issues in Counseling and Human Development (SU, Even Years) A study of gender and sex role issues pertinent to the counseling profession, and their effect on the development of children, adults, and young and older adults. Students utilize Gender Fair Guidelines for counseling as presented by the American Counseling Association. Prerequisite: CNED 5203 and CNED Doctoral standing or permission.

CNED6711 Advanced Counseling Practicum (Sp) Suervised counseling practice. A 100-clock hour approved practical counseling experience. Prerequisite: CNED Doctoral Standing. Permission of CNED Faculty and Clinical Coordinator. May be repeated.

CNED674V Internship (Sp, Su, Fa) (1-18) Supervised field placement (Clinical/Instructorship/Supervision). Prerequisite: CNED Doctoral Standing, CNED Faculty consent and CNED Clinical Coordinator Consent. May be repeated for 18 hours.

CNED680V Educational Specialist Project (Sp, Su, Fa) (1-6) An original project, research paper, or report required of all Ed.S. degree candidates. Prerequisite: admission to the Ed.S. program.

CNED699V Seminar (FA, SU) (1-18) Prerequisite: CNED Doctoral standing or permission. May be repeated for 18 hours.

CNED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

CREATIVE WRITING (CRWR)

Robert H. Brinkmeyer
Department Chair of English
333 Kimpel Hall
479-575-4301

Davis McCombs
Director
333 Kimpel Hall
479-575-4301
E-mail: dmccomb@uark.edu

Web: http://www.uark.edu/depts/english/PCWT.html/

See English for faculty list.

Degree Conferred:

M.F.A. (CRWR)

The program leading to the degree of Master of Fine Arts in Creative Writing provides graduate level training in creative writing and in the study of literature.

Required Courses: A minimum of 42 hours for a candidate with an M.A. degree in English or of 60 hours for a candidate with no M.A. Candidates with a B.A. degree that does not include a major in English may be required to take additional courses.

1. Writing and Theory Courses
   a. Writing Workshop (15 to 24 semester hours)
   b. Form and Theory of Fiction or Poetry (9 hours total: 6 hours in student's genre; 3 hours in second genre)
   c. Contemporary Fiction and Poetry (6 hours in student's genre; 3 hours in second genre)
   d. Readings in Modern or Contemporary Literature (6 hours)
2. Additional Courses, 12–24 hours of English at the advanced level.

Comprehensive Examination: A six-hour written examination covering critical terms, theories, and readings in the candidate's genre.

Thesis: An M.F.A. thesis may be either a collection of poems or stories or a novel. It should be of the quality of those works currently published by national magazines, by literary journals, and by legitimate book publishers. The degree will be withheld from any student failing to produce a suitable body of work.

Three hours of credit may be given for a thesis, or six hours of credit to a candidate who has 21 hours of workshop or less.

Final Examination: A two-hour oral examination on the thesis.

All students working toward the degree will plan their specific programs in consultation with their advisers. All degree requirements must be completed within six consecutive calendar years from the

date of first enrollment.

CROP, SOIL, AND ENVIRONMENTAL SCIENCES (CSES)

R. K. Bacon
Interim Department Head
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Web: http://www.uark.edu/depts/agronomy/index.html/

- Distinguished Professors Boyd, Oosterhuis
- University Professors Oliver, Stewart, Talbert, Wolf
- Adjunct University Professor Scott
- Professors Bacon, Barrentine, Bourland, Counce, Daniel, Gbur, Longer, Mauromoustakos, Miller, Moldenhauer, Norman, Phillips, Purcell, Rutledge, Smith, West, Wilson
- Adjunct Professor Cress
- Visiting Professor Gealy
- Associate Professors Baker, Brye, Burgos, Chen, McConnell, Savin, Scott, Slaton, Srivastava
- Research Associate Professor Mattice
- Assistant Professors Daniels, Espinoza, Kelley, Robertson, Sheng, Tingle
- Research Assistant Professors Anders, Gibbons, Mozaffari, Stephenson, Widick

Degrees Conferred:

M.S., Ph.D. (CSES)

Areas of Concentration: Crop sciences, soil sciences, and environmental sciences. Areas of specialization within these concentrations include plant breeding and genetics, biotechnology, environmental science, crop physiology, crop production, weed science, pesticide residue, seed technology, soil chemistry, soil classification, soil fertility, soil microbiology, and soil physics.

Primary Areas of Faculty Research: Environmental, soil, and water science (bioremediation, soil and water quality, microbial ecology, nutrient management, natural resource management using GIS); plant sciences (plant breeding and genetics, plant biotechnology, plant physiology, weed science).

Prerequisites to Degree Programs: While extensive undergraduate training in agriculture and physical and biological science is desirable, no specific prerequisites are required. Deficiencies in undergraduate major or prerequisites for advanced courses may be included in the student's program.

Requirements for the Master of Science Degree:

Thesis option: Minimum of 24 semester hours of course work as outlined by the student's graduate advisory committee plus six semester hours of thesis credit. The student will be given an oral examination after the thesis is completed.

Non-Thesis M.S. option: Some students wishing to obtain an M.S. degree may be better served by a program that emphasizes additional course work in the environmental and crop sciences rather than the research thesis program. Students must be approved by the department's Graduate Committee for admission into the non-thesis option before developing a program of study in concert with the student's major adviser and his/her graduate advisory committee. A minimum of 33 hours of graduate-level course work is required, including a graduate statistics class, a communication course, preferably CSES 5103 (Scientific Presentation), a 3-hour research experience taken as CSES 502V (Special Problems Research) that requires the student to demonstrate scientific thinking, synthesizing, and writing skills, a minimum of 9 hours of graduate courses at the 5000 level or higher in the plant, soil, or other relevant sciences in addition to the communication (CSES 5103) and Special Problems Research (CSES 502V) courses, and an exit seminar.

The student will interact with his/her major adviser and graduate advisory committee in completing the agreed-upon course of study and must pass an oral and a written examination given by the advisory committee over all course work completed for the degree.

Requirements for the Doctor of Philosophy Degree: After a student has been admitted to the Graduate School and accepted by the department as being qualified for advanced work, the student is assigned to a major adviser. The major adviser will, in consultation with the department head, select a graduate committee. This committee will serve both in an advisory capacity for the student's program and as the dissertation and examination committee. The student's graduate advisory committee will determine the number of hours of course work to be completed for the degree.

The student must take candidacy examinations (prelims) in at least five fields of study after completing approximately two years of graduate study and at least one year before completing all other requirements. Preliminary examinations must be written and oral. Further details regarding requirements for the Doctor of Philosophy degree are available in the department office.

Computer Sci/Computer Engr (CSCE)

CSCE5003 Advanced Programming Languages (Irregular) Abstraction, proof of correctness, functional languages, concurrent programming, exception handling, dataflow and object oriented programming, denotational semantics. Prerequisite: graduate standing.

CSCE5023 Architecture of Computer Systems (Irregular) An advanced study of both classical and recent computer hardware and software systems. Prerequisite: graduate standing.

CSCE5033 Design and Analysis of Algorithms (Sp) Design of computer algorithms, with primary emphasis on the development of efficient implementation. Prerequisite: graduate standing.

CSCE5043 Artificial Intelligence (Irregular) In-depth introduction to AI. Topics include: philosophical foundations, cognition, intelligent agents, AI languages, search, genetic algorithms, first order and modal logic, inference, resolution, knowledge representation, ontologies, problem solving, planning, expert systems, uncertainty, probabilistic reasoning, fuzzy logic, machine learning, natural language processing, machine vision, and robotics. Prerequisite: graduate standing.

CSCE5123 Database Management Systems (Fa) In-depth introduction to database management systems. Topics include: architecture, schemas, data sources, file structures, indexing, data models (relational, hierarchical, network, entity relationship, object-oriented), query languages, views, relational algebras, SQL, optimization, user interfaces, ODBC, transaction management, concurrency control, recovery, integrity, security, and commercial trends. Prerequisite: CSCE 2143 or CENG 2143 and graduate standing.

CSCE5203 Advanced Database Systems (Sp) Topics include: object databases, distributed databases, XML query, data warehouses, network as database systems, peer-peer data sharing architectures, data grids, data mining, logic foundations, semantic databases, spatial and tempral databases, and knowledge bases. Prerequisite: CSCE 5123 and graduate standing.

CSCE5213 Intorduction to Bioinformatics (Irregular) Application of algorithmic techniques to the analysis and solution of biological problems. Topics include an introduction to molecular biology and recombinant DNA technology, biological sequence comparison, and phylogenetics, as well as topics of current interest. Prerequisite: Instructor consent. (Same as BENG 5213)

CSCE5233 Principles of Compiler Construction (Irregular) Lexical analysis, parsing, symbol table construction, intermediate code generation, run-time simulation. Prerequisite: graduate standing.

CSCE5243 Formal Languages (Fa) An advanced continuation of CSCE 4323. Prerequisite: CSCE 4323 and graduate standing.

CSCE5263 Computational Complexity (Irregular) Turing machines, recursion theory and computability, complexity measures, NP-completeness, analysis on NP-complete problems, pseudo-polynomial and approximation. Prerequisite: graduate standing.

CSCE5283 Graph and Combinatorial Algorithms (Irregular) A study of algorithms for graphs and combinatorics with special attention to computer implementation and runtime efficiency. Prerequisites: graduate standing or instructor consent.

CSCE5303 Parallel Programming (Irregular) An analysis of parallel computer systems with respect to software engineering. Practical programming experience on pipelined, array, and multi-processor computers. Prerequisite: CSCE 4413 or equivalent and graduate standing.

CSCE5313 Advanced Operating Systems (Irregular) Concurrent processes and process communication; mutual exclusion and synchronization principles; kernel philosophy; resource allocation and deadlock; and case studies of specific operating systems. Prerequisite: CSCE 4413 or equivalent and graduate standing.

CSCE5323 Computer Security (Fa) Study of a broad selection of contemporary issues in computer security. Topics include access control, security policies, authentication methods, secure system design, and information assurance. Prerequisite: CSCE 4413.
CSCE5333 Computer Forensics (Sp) Various methods for identification, preservation, and extraction of electronic evidence at a computer crime scene. Specific topics include auditing and investigation of network and host instrusions, computer forensics tools, resources for system administrators and information security officers, legal issues related to computer and network forensics. Prerequisite: CSCE 5323.
CSCE5513 Intelligent Robot Control (Irregular) This course is designed to examine software issues surrounding the creation and control of autonomous robots. Techniques include: genetic programming, artificial neural networks, reinforcement learning, and symbolic methods. Programs are run in simulation and on actual robotic controllers. Topic discussed include visual processing, spatial mapping, and learning. Prerequisite: graduate standing
CSCE5523 Multiagent Systems (IR) Multiagent systems is the study, construction, and application of systems in which several interacting software (or software and human) agents pursue some set of goals or some set of tasks. The course covers agent architectures; multiagent problem-solving and planning; multiagent communication; multiagent search; multiagent learning; reasoning about action, plans, beliefs and knowledge; coordination; cooperation and competition; teamwork; and multiagent decision-making. Application examples are presented in e-commerce, scheduling, robotics, control, information retrieval, manufacturing and logistics.
CSCE5713 Multimedia Systems Design (Irregular) Overview of digital unified multimedia. Programming methodology involved in integration of all forms of digitized information (e.g., text, sound, graphics, animation, and process control) in a single computer-based interactive environment. Prerequisite: graduate standing.
CSCE5723 Client-Server Computing (Irregular) Advanced Object Oriented methods for designing software systems for network applications. Topics include implementations of distributed object models, remote database connectivity. Server side programming, and reusable components. Prerequisite: CSCE 5743 and graduate standing.
CSCE5733 Information Agency (Irregular) Study of software agents and their deployment on the internet: precursors to agents - viruses and worms, origins of software agents, delegate vs. representative agents, agency of the Internet and Web, operational guidelines for agents, HTTP, transaction security, MUD agency, intelligent agency, applications of agents: indexers, resource managers, search utilities, and commercial applications. Prerequisite: graduate standing.
CSCE5743 Object Oriented Programming for the Internet (Irregular) Object oriented design and programming for Internet client/server applications. Basics of the Internet, including TCP/IP protocol stack. Introduction to Object Oriented Programming and Object Oriented Design with Unified Modeling Language. Sockets application programming interface. Graphical user interfaces. Prerequisite: graduate standing.
CSCE590V Advanced Topics in Computer Science (Irregular) (1-3) Topics not covered in depth in other courses. Prerequisite: graduate standing. May be repeated for 3 hours.
CSCE5953 Real-time Systems (Irregular) A study of real-time system design. The development of real-time systems will be examined from the standpoint of academia, government, and industry. Scheduling, operating systems, and architecture considerations are among other topics to be covered. Prerequisite: graduate standing.
CSCE610V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CSCE620V Research in Computer Science (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.
CSCE690V Graduate Seminar (Irregular) (1-6) Concentrated study in selected areas of computer science research. Prerequisite: advanced graduate standing May be repeated for 12 hours.
CSCE700V Doctoral Dissertation (Sp, Su, Fa) (1-18) May be repeated for 5 hours.

Crop, Soil & Environmental Sci (CSES)

CSES400V Special Problems (Sp, Su, Fa) (1-6) Work on special problems in crop, soil and environmental sciences or related field. May be repeated for 8 hours.
CSES4013 Advanced Crop Science (Sp) Fundamental concepts of crop physiology, crop improvement, seed science, and crop production systems. Recitation 3 hours per week. Prerequisite: CSES 2103.
CSES402V Special Topics (Irregular) (1-3) Studies of selected topics in crop, soil and environmental sciences not available in other courses. May be repeated. May be repeated for 12 hours.
CSES4043 Environmental Impact and Fate of Pesticides (Fa) Environmental issues associated with pesticide use, including fate of pesticides in the environment, ecological impact of pesticides, and exposure risks to humans. Course recommended for students who have 12 hours of biological and /or physical sciences or consent. Lecture 3 hours per week.
CSES4103 Plant Breeding (Even years, Fa) Basic principles involved in plant breeding programs to improve crop plants and seed programs. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: ANSC 3123 or BIOL 2323.
CSES4133 Weed Identification, Morphology, and Ecology (Fa) Study of weeds as economic pests occurring in both agricultural and nonagricultural situations and including poisonous plants and other specific weed problems. Gross morphological plant family characteristics which aid identification, habitat of growth and distribution, ecology, competition, and allelopathy are discussed. Lecture 2 hours, laboratory 2 hours a week. Corequisite: Lab component. Prerequisite: CSES 2103 (or HORT 2003).
CSES4143 Principles of Weed Control (Sp) Advanced concepts and technology used in modern weed control practices and study of the chemistry and specific activity of herbicides in current usage. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CHEM 2613 and CHEM 2611L and CSES 2003.
CSES4224 Soil Fertility (Fa) Study of the soil's chemical, biological and physical properties, and human modification of these properties, as they influence the uptake and utilization of the essential nutrients by plants. Lecture 3 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CSES 2201L and CSES 2203.
CSES4234 Plant Anatomy (Sp) Advanced training in plant anatomy. Studying the structure, terminology, techniques and function associated with vascular plant anatomy. Corequisite: Lab component. Prerequisite: BIOL 1613/1611 or BIOL 1543/1541L.
CSES4253 Soil Classification and Genesis (Sp) Lecture and field evaluation of soil properties and their relation to soil genesis and soil classification with emphasis on soils of Arkansas. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CSES 2203.
CSES4803 Precision Agriculture (Odd years, Fa) Introduction to precision agriculture, benefits, spatial variability within a field, zone concept, site-specific management. Spatial data collection: sensors, GPS, yield monitoring, remote sensing. Knowledge discovery from data: data processing, neural networks, genetic algorithms, use of GIS. Decision support systems. Variable-rate technology: real-time and map-based systems, variable-rate machinery, and smart controls. Evaluation: yield mapping, economic analysis. (same as BENG 4803). Corequisite: Lab component. Prerequisite: MATH 1213 and junior standing.
CSES5001 Weed Science Practicum (Su) Training for membership on weed team, through participation. Prerequisite: graduate standing.
CSES5013 Crop Physiology (Odd years, Fa) Understanding and quantitative measurement of physiological processes, plant responses, and environmental parameters in relation to the production of crops. Prerequisite: BIOL 4304.
CSES5023 Weed Physiology and Herbicide Resistance in Plants (Odd years, Fa) The reproduction, growth, and development of weeds and the ecological factors affecting these processes; development and mechanisms of herbicide resistance, flow of herbicide-resistance genes; and development of herbicide-resistant crops. Corequisite: Lab component. Prerequisite: CSES 4143 and (BIOL 4304 or CHEM 5813).
CSES502V Special Problems Research (Sp, Su, Fa) (1-6) Original investigations on assigned problems in agronomy. Prerequisite: graduate standing.
CSES5033 Advanced Soil Fertility and Plant Nutrition (Even years, Fa) Study of water uptake, ion absorption, translocation and metabolism in higher plants. Lecture 3 hours per week. Prerequisite: BIOL 4304 and CHEM 2613 and CHEM 2611L.
CSES504V Special Topics (Irregular) (1-4) Topics not covered in other courses or a more intensive study of specific topics in agronomy. Prerequisite: graduate standing. May be repeated for 99 hours.
CSES5053 Scientific Writing (Fa) Open to graduate students, especially those in agricultural and life sciences. The course will cover searching the scientific literature, writing theses, proposals, journal articles, and other scientific documents. Emphasis on style and techniques used in scientific publication. Lecture and workshop 3 hours per week. Prerequisite: graduate standing.
CSES5103 Scientific Presentations (Sp) Experience in procedures required for professional presentations of scientific papers, seminars, posters; and research findings at meetings in conferences, and with discussion groups. Instruction in organization of materials, visual aids, and good speaking habits. Lecture 3 hours per week. Prerequisite: graduate standing.
CSES5124 Crop Molecular and Physiological Genetics (Even years, Sp) Study of genome organization and expression in agronomic and horticultural plants, with emphasis on genes regulating physiological processes. Lecture 3 hours, discussion 1 hour per week.CSES 5013 and CHEM 5813 and CHEM 5843 are recommended but not required. Corequisite: Drill component. Prerequisite: BIOL 4304 and BIOL 2323 and BIOL 3321L (or ANSC 3123).
CSES5204 Applied Math Methods in Life Sciences (Odd years, Fa) Methods of data presentation and mathematical descriptions of research data in the life sciences including graphical presentations, linear regression, growth equations, kinetics, transport equations, and compartmentalization. Analytical, numerical, and statistical approaches to the solution of research problems in life sciences will be emphasized. Lecture 3 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: MATH 2564 and AGST 4023.
CSES5214 Analytical Research Techniques in Agronomy (Even years, Fa) Preparation and analysis of plant and soil samples utilizing spectrophotometry, isotopes, and chromatographic separation methods. Additionally, measurements are made of photosyntheses, respiration, water relationships, light, and temperatures in whole plants. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: BIOL 4304 and CHEM 2613 and CHEM 2611L.
CSES5224 Soil Physics (Sp) Physical properties of soils and their relation to other soil properties, growth of plants and transport of water, oxygen, heat, and solutes such as pesticides and plant nutrients. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CSES 2203 and MATH 1203.
CSES5233 Plant Genetic Engineering (Odd years, Sp) Topics will be covered in the field of in vitro plant biology, transgene genetics and crop genetic engineering. Concepts and applications of transgenic plant technology will be discussed, with the emphasis on the strategies for crop improvement and gene discovery. Lecture 3 hours.
CSES5264 Soil Microbiology (Odd years, Sp) A study of the microorganisms in soil and the biochemical processes for which they are responsible. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2013 and BIOL 2011L.
CSES5353 Advanced Hay and Silage Production (Fa) Advanced study of the principles of good hay and silage production. The course includes a detailed review of forage nutritive value followed by an in-depth discussion of the management of wilting forage crops, silage biochemistry, ensiling characteristics of various forages, silo management, spontaneous heating in hay and silage, dry matter loss, management of stored hay, and changes in forage quality that result from poor conservation of harvested forages. Prerequisites: CSES 3113, ANSC 3152 and ANSC 3151L. (Same as ANSC 5353)
CSES5453 Soil Chemistry (Even years, Sp) Application of the principles of chemistry to processes of agronomic and environmental importance in soils. Soil clay mineralogy, soil solution thermodynamics, structure and reactivity of humus, surface complexation and ion exchange, electro-chemical phenomena, and colloidal stability. Prerequisite: CSES 2203 and CHEM 1123 and CHEM 1121L.
CSES5543 Plant Genomics (Odd years, Fa) Plant genetics based on the study of whole genome sequence, transcriptome and proteome. Provides an overview of the principles and techniques of experimental and in silico genomics. Covers all areas of genome research

including structural, comparative and functional genomics as well as proteomics. Prerequisite: CHEM 5843 or any graduate level genetics course.
CSES600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
CSES6113 Herbicide Behavior (Even years, Fa) Biochemistry, physiology and behavior of herbicides in plants, soils, and the environment. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CSES 4143 and BIOL 4304 and CHEM 3813.
CSES622V Advanced Topics in Soil Science (Irregular) (1-6) Topics include doctoral-level concepts in soil physics, soil chemistry, and soil microbiology/biochemistry not considered in other soil science courses. Prerequisite: graduate standing. May be repeated for 99 hours.
CSES6253 Forage-Ruminant Relations (Odd years, Sp) Advanced chemical, physical, and botanical characteristics of forage plants, the dynamics of grazing, intake and digestion, and techniques of measuring forage utilization and systems analysis at the plant-animal interface. Lecture 3 hours per week. (Same as ANSC 6253) Prerequisite: ANSC 3143 and CSES 3113. (Same as ANSC 6253)
CSES700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.

Agricultural Statistics (AGST)

AGST400V Special Problems (Sp, Su, Fa) (1-6) Work on special problems of agricultural statistics or related areas.
AGST4011 SAS Programming for Agricultural Sciences (Sp, Fa) An introduction to the SAS programming language with an emphasis on the reading and restructuring of data files, and the displaying of data in tabular and graphic forms. The course is taught using a hands-on approach.
AGST4023 Principles of Experimentation (Sp, Fa) Fundamental concepts of experimental and statistical methods as applied to agricultural research. Lecture 3 hours per week. Prerequisite: MATH 1203 or higher level.
AGST500V Special Problems (Sp, Su, Fa) (1-6) Individual investigation of a special problem in some area of statistics applicable to the agricultural, food, environmental, and life sciences not available under existing courses. May be repeated for 6 hours.
AGST5014 Experimental Design (Sp) Types of experimental designs, their analysis and application to agricultural research. Lecture 3 hours and laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: AGST 4011 and (AGST 4023 or STAT 4003).
AGST504V Special Topics (Irregular) (1-4) Topics not covered in other courses or a broader-based study of specific topics in statistics and related areas. Prerequisite: graduate standing. May be repeated for 99 hours.
AGST5713 Applied Regression Analysis for Agricultural Sciences (Fa) Analysis of agricultural experiments which contain quantitative factors through regression procedures. Lecture 3 hours per week. Prerequisite: AGST 4011 and (AGST 4023 or STAT 4003).
AGST5803 Case Studies in Biometry (Sp) Non-standard statistical problems arising in the agricultural, food, environmental, and life sciences. Prerequisite: STAT 5113 and STAT 5313 and either AGST 5014 or STAT 4373.
AGST5901 Statistical Consulting Process (Sp) Examines the components of statistical consulting with emphasis on the interpersonal aspects.
AGST5913 Statistical Consulting Practicum (Fa) Supervised statistical consulting. Prerequisite: STAT 5313 and AGST 5901 and either (AGST 5014 or STAT 4373).

CURRICULUM AND INSTRUCTION (CIED)

Tom Smith
Department Head
214 Peabody
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Web: www.uark.edu/depts/coehp/CIED.htm

- Professors Besonen, Farah, Gartin, Smith, Taylor, Totten
- Associate Professors Collier, Gallavan, Imbeau, Johnson, Wavering
- Assistant Professors Collins, Eilers, Frevert, Lincoln, Kirkpatrick, Penner-Williams
- Instructors Cronan, Jordan, Riggs

Degrees Conferred:

M.A.T. in Childhood Education (CHED) (See Childhood Education)
M.A.T. in Middle Level Education (MLED) (See Middle-Level Education)
M.A.T. in Secondary Education (SEED) (See Secondary Education)
M.Ed. in Elementary Education (ELED) (See Elementary Education)
M.Ed. in Secondary Education (SEED) (See Secondary Education)
M.Ed. in Special Education (SPED) (See Special Education)
Ed.S. (CIED)
Ph.D. (CIED)

Requirements for the Educational Specialist Degree: This degree program is designed to provide the candidate with opportunities to develop in-depth competency related to particular needs. Flexibility exists in planning the 60-hour minimum program to take into account the occupational needs and professional aspirations of each student. Students seeking an Ed.S. degree in Education through the Department of Curriculum and Instruction may specialize in one of the following areas: Curriculum and Instruction, Reading, English as a Second Language, or Gifted and Talented Education. The student must complete a total of 60 graduate hours that is planned with an adviser and approved by an advisory committee. The program of study must include 12 hours in the area of specialization and nine hours of study outside the area of specialization. The program must also include EDFD 5393 Statistics in Education and Health Professions, and CIED 680V, Ed.S. Project (three hours). See College of Education and Health Professions.

The Ph.D. Program in Curriculum and Instruction: The emphasis of the Doctor of Philosophy degree program in curriculum and instruction will be upon the generation of new knowledge or the reformulation of existing knowledge as a basis for the development of educational theory. The test of knowledge for a person working toward this degree is not conditioned upon ability to improve educational practice but rather upon possible contribution to the development of educational theory. Persons working toward this degree goal may assist in the improvement of practice, but their interests in the results are conditioned primarily by the extent to which they assist in reformulation of their own theoretical base. Highly developed research skills are an essential facet of this degree program.

Prerequisites to the Doctor of Philosophy Degree Program: Applicants for the degree of Doctor of Philosophy must meet the following requirements in addition to the applicable requirements of the University prior to admission to the degree program:

1. Have a minimum grade-point average of 3.50 on all graduate courses.
2. Have a master's degree with a minimum of 33 semester hours in a related area.
3. Have minimum Graduate Record Examinations scores of 500 on the quantitative section, 500 on the verbal section, and an appropriate score on the writing portion completed no more than five years prior to the date of application.
4. Have completed a minimum of three years full-time professional teaching experience or equivalent employment experiences prior to the application to the doctoral program.
5. Complete a writing assignment designed and evaluated by the specific program area of concentration and administered through the Department of Curriculum and Instruction.
6. Complete a departmental interview concerning personal goals, professional goals, background experiences, and the results from the previously completed writing assignment.

Requirements for the Doctor of Philosophy Degree: After acceptance into the program, the candidate for the Doctor of Philosophy degree must meet the general University degree requirements, complete residency requirements, and complete a minimum of 102 semester hours of graduate study approved by the Doctoral Advisory Committee, including 60 semester hours taken on this campus. The residency requirements are the completion of two consecutive semesters on campus during which the student will complete a one-semester internship in college teaching and a one-semester internship in research.

The program of study for the Doctor of Philosophy candidate must include the following:

1. 33 semester hours or more in an approved master's degree program

2. 15 hours in research and statistics to include the following:
   EDFD 6403 Educational Statistics and Data Processing
   EDFD 6413 Experimental Design in Education
   CIED 6443 Advanced Research in Curriculum & Instruction
   Six additional hours from the following:
   EDFD 6423 Multiple Regression Techniques for Education
   EDFD 6453 Applied Multivariate Statistics
   EDFD 6533 Qualitative Research
   EDFD 6653 Measurement and Evaluation
   EDFD 699V Seminars (as approved by advisory committee)
   Other 5000- or 6000-level classes with approval of advisory committee
3. 25 semester hours of curriculum and instruction courses to include 3 semester hours of curriculum development, 3 semester hours in instructional theory, 3 semester hours of multicultural education, 6 semester hours of internship, and 10 hours of CIED electives.
4. 12 semester hours in the cognate field approved by the Doctoral Advisory Committee
5. 18 semester hours or more of dissertation.

Note: Electives/cognate hours must be taken outside the department and/or the college. Elective/cognate hours may include the specialization in a content area; no more than six (6) hours may be taken as independent study.

Curriculum and Instruction (CIED)

CIED4133 Introduction to Aural Rehabilitation (Sp) Study of the technique used in the rehabilitation of speech and language problems of the hearing impaired including the role of amplification, auditory training, and speech reading in rehabilitation. Prerequisite: CDIS 3103.

CIED5003 Childhood Seminar (Sp) This course is designed to synthesize the foundational content presented in the Master of Arts in Teaching core courses. It focuses on refinement of the generalized knowledge to accommodate specialized content children. Professional attitudes, knowledge and skills relevant to young children. Professional attitudes, knowledge and skills applicable to today's early childhood educator are addressed. Prerequisite: admission to the CHED M.A.T.

CIED5012 Measurement, Research, and Statistical Concepts for Teachers (Su) An introduction to constructing, analyzing, and interpreting tests, types of research and the research process, qualitative and quantitative techniques for assessment, and descriptive and inferential statistics.

CIED5013 Measurement, Research and Statistical Concepts in the Schools (Su) An introduction to constructing, analyzing, and interpreting tests; types of research and the research process; qualitative and quantitative techniques for assessment; and descriptive and inferential statistics. Prerequisite: Admission to Graduate School. May be repeated.

CIED5022 Classroom Management Concepts (Fa) A number of different classroom management techniques are studied. It is assumed that a teacher must possess a wide range of knowledge and skills to be an effective classroom manager. Prerequisite: admission to the M.A.T. program.

CIED5032 Curriculum Design Concepts for Teachers (Sp) The design and adaptation of curriculum for students in regular and special classrooms. Theoretical bases and curriculum models are reviewed. Concurrent clinical experiences in each area of emphasis are included. Prerequisite: admission to the M.A.T. program.

CIED5042 Reading and Writing Across the Curriculum (Su, Fa) This course teaches the integration of reading and writing in the content areas. Reading and writing as integrated strands of the language process is presented in the context of instructional principles and suggested teaching practices. A solid research base is emphasized while keeping the focus on practical application. Prerequisite: admission to the M.A.T. program.

CIED5052 Seminar: Multicultural Issues (Su) This seminar provides an introduction to the major concepts and issues related to multicultural education. The ways in which race, ethnicity, class, gender, and exceptionality influence students' behavior are discussed. Prerequisite: admission to the M.A.T. program.

CIED5053 Multicultural Issues in Elementary Education (Su) This course provides an introduction to the major concepts and issues related to multicultural education in elementary classrooms. The ways in which race, class, gender and exceptionality influence students' behavior are discussed. Prerequisite: Admission to Grad. School. May be repeated.

CIED5063 Contemporary and Futuristic Concerns of Childhood Education (Sp) Historical, Contemporary and Future Perspective of Childhood Education. A problecs course in childhood education which deals with historical, current and future concerns. These early childhood concerns include demographic trends, family composition and change, instructional models, social/political/economic issues, parent/community involvement, and evolving professional roles. Prerequisite: admission to the CHED M.A.T. program.

CIED5073 Case Study in Childhood Education (Sp) Provides the students with experience in conducting case studies related to childhood education. In addition, students gain knowledge regarding practices used in ethnographic research. Prerequisite: admission to M.A.T. program.

CIED508V Childhood Education Cohort Teaching Internship (Sp, Fa) (1-6) May be repeated for 6 hours.

CIED5093 Methods of Instruction for Middle Level I (Su) A study of methods and materials in the special content areas (math, science, English/language arts, and social studies). The planning of instruction, microteaching, and the development of middle school instructional materials are included. Prerequisite: admission to M.A.T. program.

CIED5103 Advanced Middle Level Principles (Sp) An in-depth examination of recent research on the major issues, practices, and policies for middle level education. Emphasis is on analysis of cutting edge issues germane to the life, education, and welfare of the early adolescent via the integration of theory and practice. Prerequisite: admission to Masters of Arts in Teaching program.

CIED5113 Reading Across the Middle Level (Sp, Su, Fa) An overview of methods and materials for teaching reading to early adolescents. Reflective activities and site-based field experiences are integrated with course content to provide continuity between theory and practice. Portfolio expectations will be a primary means of course evaluation. Prerequisite: admission to the middle level education program and CIED 3113.

CIED5123 Writing Process Across the Curriculum (Middle Level) (Sp) This course will provide an overview of the research, and methods for incorporating writing across all curriculum. Writing as a process will be emphasized. Reflective activities and site-based field experience will be integrated into the course content. Prerequisite: admission to M.A.T. Program.

CIED5132 Research in Middle Level Curriculum and Instruction (Fa) An introduction to inquiry and research in middle level curriculum and instruction. It examines the principles, strategies, and techniques of research, especially qualitative inquiry. Practicum in educational research and evaluation is done as part of the class. Prerequisite: admission to the MAT program.

CIED514V Internship: Middle Level (Sp, Su, Fa) (1-6) The internship for middle level education is an extended field experience in which a preservice teacher integrates knowledge and skills developed in education classes with practice in the field. Prerequisite: admission to the M.A.T. program.

CIED5150 Middle School Practicum (Sp, Su, Fa) Provides practical experiences in conjunction with specified middle level course. Reflective activities and site-based field experiences are integrated with course content to provide continuity between theory and practice. Portfolio expectations will be a primary means of course evaluation. Prerequisite: enrollment is associated with middle level education courses.

CIED5153 Design and Preparation of Curriculum Materials (Sp, Su, Fa) (Formerly SEED 5153) Principles and procedures for the selection, development, and organization of curriculum materials including learning packages, simulation and gaming, units, courses of study or curriculum guides. Prerequisite: EDFD 5373 or equivalent.

CIED5162 Applied Practicum (Fa) Provides laboratory experiences for RDNG 5123 (Literacy Assessment) and RDNG 113 (Reading in Early Childhood Education). Corequisite: CIED 5183 and CIED 5173. Prerequisite: admission to the M.A.T. program.

CIED5173 Literacy Assessment (Fa) Focuses on assessment of young children's literacy skills. Techniques discussed include informal observation, miscue analysis, and portfolio assessment. Prerequisite: admission to the CHED M.A.T.

CIED5183 Readings in Early Childhood Education (Fa) Will continue to develop understandings of classic studies and will explore the impact these have had on the most recent issues in early childhood education. Prerequisite: admission to the CHED M.A.T.

CIED5193 Methods of Instruction for Middle School II (Fa) Second special methods course for teaching at the middle level. Emphasizes further refinement of teaching skills and methods; the integration of the sciences, mathematics, and technology; science, technology, and society (STS) issues; and the integration of social studies and English language arts. Prerequisite: CIED 5092 and admission to the M.A.T. program.

CIED5223 Issues and Principles of Secondary Education (Su) This course provides an introduction to the Secondary Education M.A.T. program. It provides the student with information about foundation issues in education, including history and philosophy of American Education, current trends and issues in education, psychological and social theories of education, characteristics of learners, and learning processes. Prerequisite: admission to M.A.T. degree program.

CIED5232 Interdisciplinary Studies (Sp, Su, Fa) Introduction to the nature of interdisciplinary study: curricular content, course planning (topics and themes), instructional strategies, and evaluation and assessment. Prerequisite: admission to the M.A.T. program.

CIED5243 Special Methods of Instruction I (Su) Study of the methods and materials in the special content areas. Includes philosophical, cognitive, and psychological dimensions of teaching the content area. The planning of instruction, microteaching, and the development of instructional materials are included. Prerequisite: admission to the M.A.T. program.

CIED5253 Special Methods of Instruction II (Fa) Study of the methods and materials in the special content areas. Classroom applications of teaching strategies with analysis of teacher effectiveness in seminar settings. Prerequisite: admission to the M.A.T. program.

CIED5262 Special Methods of Instruction III (Sp) Study of the methods and materials in the special content areas. The focus is on student-centered and interdisciplinary teaching strategies. Extended content units are developed and implemented in the partnership school setting. Prerequisite: admission to the M.A.T. Program.

CIED5263 Measurement and Evaluation (Sp, Su, Fa) A study of measurement, testing, and evaluative procedures including types of tests, abuses of tests, test construction, scoring, analysis and interpretation, statistical methods, and alternative evaluation and assessment techniques. Prerequisite: admission to the M.A.T. program.

CIED5273 Research in Curriculum and Instruction (Sp, Su, Fa) An introduction to inquiry and research in curriculum and instruction. It examines the principles, strategies, and techniques of research, especially qualitative inquiry. Qualitative method in assessment and evaluation are considered. Practicum in educational research and evaluation is done as part of the class. Prerequisite: admission to the M.A.T. program.

CIED528V Secondary Cohort Teaching Internship (Sp, Su, Fa) (1-6) May be repeated for 6 hours.

CIED5293 Special Methods, Interdisciplinary Section (Sp) The third and final

part of the middle level special methods course. Provides interns with the knowledge, dispositions, and skills for developing an interdisciplinary course of study in conjunction with the members of their interdisciplinary team. Prerequisite: CIED 5092 and CIED 5913 and admission to M.A.T. program.

CIED5323 Transition Planning for Persons with Disabilities (Sp) Prepares students to plan, evaluate, and implement transition programs within both regular and special classrooms at the elementary, middle and secondary school levels.

CIED532V Practicum in Special Education (Irregular) (1-6) Supervised field experiences in special education programs, schools, institutions, and other facilities for exceptional children.

CIED5343 Applied Classroom Management (Fa) An advanced course in managing behaviors in students with exceptionalities. Students are provided with experiences in applying theoretical bases of classroom management through identifying, assessing graphing, and analyzing behavioral data and implementing management plans. Ethical issues in classroom management are addressed.

CIED5373 Advanced Methods for Teaching Students with Exceptionalities (Fa) An advanced course in designing and implementing individualized programs for students with exceptionalities. Students are provided practical experience in applying learning theories and instructional methodologies developed and observed in previous coursework. Prerequisite: acceptance into the SPED M.A.T. program.

CIED5403 Early Childhood Education: Rationale and Curriculum (Irregular) Rationale and curriculum of an early childhood education program, with special attention given curricular frameworks and professional organization policies.

CIED5413 Early Childhood Education: Methods and Materials (Irregular) An interdisciplinary approach to methods and materials used in early childhood education with emphasis on developmental literacy. Prerequisite: PSYC 3093 and CIED 5403.

CIED5423 Curriculum Reconstruction (Sp, Su, Fa) Changes in curriculum development and design as related to changing social/economic/political arenas. Theories of curriculum development, implementation and evaluation are researched.

CIED5433 Children's Literature (Sp, Su, Fa) Issues and trends in children's literature. Contemporary works are evaluated and reviewed based on changing social political conditions. Multicultural approach to children's literature is emphasized. Prerequisite: undergraduate course in children's literature.

CIED5453 Evaluation Techniques (Irregular) Evaluation of learning using traditional means of assessment as well as alternative or authentic assessment techniques.

CIED5463 Child Behavior and Development (Sp, Su, Fa) Advanced study of research and theory. A thematic and case study approach to child behavior and development which investigates the child's behavior and needs in the school setting. Emphasis on current research. Prerequisite: PSYC 3093.

CIED5473 Advanced Course in Children's Literature (Irregular) Compares and contrasts contemporary award winning books with children's classics, analyzing elements of style. Focuses on use of rhetorical devices. Prerequisite: CIED 3103 and CIED 5433.

CIED5483 Teaching Mathematics (Irregular) Content, methods, and materials for teaching multiple strands of elementary school mathematics. Emphasis on principles and procedures of a conceptual and integrated approach to learning mathematics. Prerequisite: undergrad coursework in teaching elementary or early childhood mathematics.

CIED5493 Teaching Social Studies (Irregular) Purpose, content, psychology, materials, and methods for teaching the social sciences in the elementary school. Emphasis on principles and procedures for combining the social studies with other areas of the curriculum in broad unit instruction. Prerequisite: Undergraduate coursework in teaching elementary or early childhood social studies.

CIED5503 Teaching Science (Sp, Su, Fa) The influence of science on the community, on the home, and the child. Use of science in the living and learning of the child at school.

CIED5533 Teaching Language Arts (Sp, Su, Fa) The place of the language arts in the elementary curriculum. Exploration of materials, content, practices, and methods, used in reading, speaking, listening, and writing experiences.

CIED5553 Problems in Elementary Education (Sp, Su, Fa) Problems, trends, and issues related to the elementary school.

CIED5573 Teaching Reading (Sp, Su, Fa) Teaching of reading to children; techniques, research, and modern practices.

CIED5583 Correlates of Reading Process (Sp, Su, Fa) The developmental program is emphasized through a student of the reading process. Learning theory and research are related to reading instruction and materials through the development and application of evaluative criteria based on an understanding of reading process. Prerequisite: CIED 5573.

CIED5593 Corrective Reading in the Classroom (Sp, Su, Fa) Emphasizes the diagnosis and remediation of reading difficulties in the classroom setting. Students are expected to become familiar with cause of reading failure, diagnosis instruments and procedures, principles of report writing, and corrective instructional methods and materials. The course is open to graduate students with instructor's consent. Enrollment limited to 20. Prerequisite: CIED 5573.

CIED5603 Innovations in School Education (Sp, Su, Fa) An examination of the change process in education with emphasis on those elements which support or hinder change in the schools, and the detailed study of schools innovations on national, state, and local levels.

CIED5613 Contemporary Issues in Education (Sp, Su, Fa) A study of issues pertaining to the goals, objectives, organization, and curriculum of the schools with an analysis of the teacher's role in dealing with current concerns in these areas.

CIED5623 The School Curriculum (Sp, Su, Fa) General principles and techniques of selecting and organizing curricular materials.

CIED5633 Analysis of Instruction (Sp, Su, Fa) A survey of the research and literature related to the systematic study of the field of teaching. An examination of the definitions of teaching and the knowledge base on which teaching is predicated. A study of the implications of the research of effective teaching and the key curricular and instructional issues.

CIED5653 Methods of Middle School Instruction (Sp, Su, Fa) Philosophy, rationale, and instructional practices of middle school instruction. Prerequisite: graduate standing.

CIED5663 Evaluation of Instruction (Sp, Su, Fa) Examination of methods and philosophies of evaluation. Consideration will be given to grading, techniques of grading, and construction of behavioral objectives and test items.

CIED567V Teaching Foreign Cultures in Social Studies Curricula (Sp, Su, Fa) (1-6) Extensive examination of foreign cultures (West Europe, USSR, China, Latin America) and methods of teaching about them in secondary school social studies.

CIED5683 Adolescent Literature (Sp, Su, Fa) Content course in adolescent literature including selection, reading, evaluation, and psychological basis of classic and contemporary works. Prerequisite: PSYC 3093 or equivalent.

CIED5696 Interdisciplinary Instruction K-4 (Sp, Su, Fa) Stresses the learning of science, mathematics, and reading in grades K-4 as active, integrated constructive processes involving experimentation, investigation, communication, reasoning, and problem solving. Builds foundations in content to show connections and relevant applications of these disciplines.

CIED5723 Nature and Needs of Persons with Mild Disabilities (Irregular) Educational, psychological, and social characteristics of individuals who are mildly handicapped with emphasis on educational modifications. Prerequisite: CIED 3023.

CIED5733 Inclusive Practices for Diverse Populations (Sp, Su) An advanced study of the characteristics of persons with exceptional learning needs and the provision of appropriate instruction in the general education classroom. Prerequisite: Graduate status. May be repeated.

CIED5743 Teaching Persons With Physical and Health Disabilities (Sp) This course is an advanced course at the master's level in the specialty studies. The Scholar Practitioner model at this level will pursue an in-depth study of the characteristics, needs, and methods for teaching of persons with physical and health disabilities while emphasizing advance learning in the specialty studies and the social and behavioral studies in the substantive areas. Prerequisite: Graduate status. May be repeated.

CIED5753 Nature and Needs of Persons with Serious Emotional Disorders (Irregular) A survey of the educational, psychological, and social characteristics of individuals with serious emotional disorders. Four major categories of behaviors (personality disorders, pervasive developmental disorders, and learning/behavior disorders) are reviewed in relationship to identification, assessment, and program intervention within the public school setting. Prerequisite: CIED 3023.

CIED576V Teaching Severely Handicapped Children (Irregular) (1-6) Methods and materials for teaching students with severe handicaps, including severe mental retardation, serious emotional disturbance, and severe physical disabilities.

CIED5793 Corrective Reading Practicum (Sp, Su, Fa) Laboratory experience in which students diagnose reading difficulties and practice remedial measures under the direct supervision of the instructor. Emphasis is given to continuous diagnosis and to the use of commercially produced materials and trade books in remediation. Enrollment limited to 15. Prerequisite: CIED 5593.

CIED5803 Nature and Needs of the Gifted and Talented (Fa) Educational, psychological, and social characteristics of gifted and talented children. Prerequisite: graduate standing.

CIED5813 Curriculum Development in Gifted & Talented (Sp) Examines the various models for developing curriculum and providing services for students identified for gifted programs. Prerequisite: CIED 5803.

CIED5823 Gifted and Talented (Structured) Practicum (Su) Supervised field experience in gifted education programs, schools, institutions, and other facilities for gifted/talented children. Prerequisite: CIED 5813.

CIED5833 Gifted and Talented (Flex) Practicum (Fa) Students design and implement an individualized practicum experience (Type III Renzulli) that provides the opportunity to refine and enhance personal attitudes, beliefs, and skills in gifted education. Prerequisite: CIED 5823.

CIED5873 Assessment of Exceptional Students (Fa) Methods and techniques of assessment of children in all areas of exceptionality with emphasis on diagnosis and classification.

CIED5883 Research in Special Education (Irregular) Review of research in special education including all areas of exceptionality with emphasis on diagnosis and classification.

CIED5893 Organization, Administration and Supervision of Special Education (Irregular) Procedures, responsiblities and problems of organization, administration, and supervision of special education programs.

CIED5903 Adaptive Instruction (Su) An examination of the general principles and techniques for adapting instruction to meet the needs of various learning styles and learning modalities, especially those with exceptional strengths.

CIED5913 Professionalization of Teaching (Sp, Su, Fa) Explores the need for reconceptualizing the role and responsibility of career professional teachers and concomitant implications for school improvement and educational change. Reflection and inquiry processes are integrated with course content to increase congruence between theoretical bases and professional barriers. Prerequisite: experience as a practicing educator.

CIED5923 Second Language Acquisition (Sp) This is one of four courses leading to Arkansas approved endorsement for teaching English as a Second Language (ESL). The course gives an introduction to the basics in research and learning theories involved in the acquisition of second languages and cultures, particularly ESL.

CIED5933 Second Language Methodologies (Fa) This is one of a series of four courses leading to Arkansas approved endorsement for teaching English as a Second Language (ESL). The course introduces the basics in approaches, methodologies, techniques, and strategies for teaching second languages, especially ESL.

CIED5943 Teaching People of Other Cultures (Fa) This is one in a series of four courses leading to Arkansas approved endorsement for teaching English as a Second Language (ESL). The course focuses on cultural awareness, understanding cultural differences, and instruction methods for integrating second cultures, especially the culture of the United States, into the curriculum.

CIED5953 Second Language Assessment (Sp) This is one in a series of four courses leading to Arkansas approved endorsement for teaching English as a Second Language (ESL). The course introduces basic methods for testing, assessing and evaluating

second language, especially ESL, learners for placement purposes and academic performance.
CIED5963 Reading in Secondary Schools (Sp, Su, Fa) Methods and materials of teaching reading in secondary schools with emphasis on remedial and developmental reading problems of students.
CIED599V Special Topics (Fa, Sp, Su) (1-18) May be repeated for 18 hours.
CIED6013 Curriculum Development (Fa) Principles and concepts of curriculum and development, with an analysis of the factors basic to planning, the aims of the educational program, the organization of the curriculum, curriculum models, and elements desirable in the curriculum of schools.
CIED6023 Instructional Theory (Irregular) Study of psychological, anthropological, sociological, and educational theories of instruction and learning. Emphasis is placed on synthesizing a broad range of existing and emerging perspectives in understanding individual, interactional and contextual phenomena of instruction and learning. Prerequisite: EDFD 5373.
CIED6033 Content Specific Pedagogy (Irregular) This course explores the relationship between the content of courses taught in schools and the pedagogical principles that the teaching of the content requires. Students will discuss and synthesize findings from the research literature and from personal investigation. Prerequisite: CIED 6203.
CIED6043 Analysis of Teacher Education (Irregular) This course examines issues, problems, trends, and research associated with teacher education programs in early childhood, elementary, special education, and secondary education. Prerequisite: CIED 6023.
CIED6053 Advanced Assessment (Sp) This course provides a survey of assessment methods used to evaluate students' levels of performance in educational settings. Prerequisites: Admissions to EdS or PhD. May be repeated.
CIED6063 Systemic Change In Education (Sp) This course is designed to critically examine education and society and interplay their interdependence between them, to differentiate between meaningful and superficial change, and to explore the agents of change in a diverse and complex social environment. Prerequisites: Admission to Ed.S. or Ph.D program. May be repeated.
CIED6073 Seminar in Developing Creativity (Irregular) A study of the facets of creativity, how they can be applied to be used in one's everyday life, how they can be applied in all classrooms, and how to encourage the development of these in students.
CIED6083 Piaget's Theory and Instruction (Odd years, Sp) Piaget's theory has been applied to classroom instruction in various settings. This course will investigate the theory in depth, study classroom application, and students will devise application. Prerequisite: CIED 6023.
CIED6103 Early Childhood Education Curriculum (Sp, Su, Fa) Advanced course in curriculum design and evaluation for early childhood education programs. Prerequisite: CIED 5443.
CIED6203 Individual Diagnosis and Remediation in Reading (Sp, Su, Fa) Specialized techniques and material for diagnosis and remediation of reading disability. Rationale of the clinical setting is developed through emphasis on an interdisciplinary approach to diagnosis, program planning, and remediation. Enrollment limited to 20. Advanced graduate students only. Prerequisite: CIED 5583 and CIED 5593.
CIED6223 Investigations in Reading (Sp, Su, Fa) Research techniques and findings in reading are extensively reviewed by the student. Student is expected to culminate activity in this course by identifying a research problem in the field of reading for possible further study. Prerequisite: reading certification.
CIED6233 Organization of Reading Programs (Sp, Su, Fa) Study of the problem of organizing the classroom, individual school, and school system, for the improvement of reading instruction. Emphasis is given to the development of program organization rationale based on requirements of the teaching-learning setting.
CIED6313 Issues, History, and Rationale of Science Education (Irregular) This course is the foundation experience for those interested in the discipline of science education. It provides an overview of the fundamental issues in and vocabulary of science education. The course includes the research basis for science teaching, the literature of science education, and the issues and controversies surrounding the teaching of science. May be repeated.
CIED6323 Science Seminar (Sp, Su, Fa) Broaden the perspective of science educators who have the necessary background, knowledge, and skills to become effective professionals in higher education. Emphasis is on current trends in secondary science, issues developing in secondary science, research in science education, philosophy, and history of science education.
CIED6333 Nature of Science: Philosophy of Science for Science Educators (Irregular) The Nature of Science is a hybrid arena consisting of aspects of the philosophy, history and sociology of science along with elements of the psychology of scientific observations all targeting the complete understanding of how science actually functions. Prerequisite: Admission to Grad School. May be repeated.
CIED6343 Advanced Science Teaching Methods (Irregular) This course is designed for those educators who have had some previous instruction in science teaching methods and/or had some prior science teaching experience. Students will gain new or renewed perspectives with respect to their personal teaching ability while engaging in discussions and activities designed to assist others in professional grow in science instruction. Prerequisite: Admission to Graduate School. May be repeated.
CIED6403 Emerging Issues in Special Education (Irregular) A study in the complex issues with which professionals in the field of special education must be familiar and prepared to address.
CIED641V Special Topics in Special Education (Irregular) (1-6) Discussion and advanced studies on select topics in special education. Specific focus on recent developments. May be repeated for 6 hours.
CIED6423 Philosophical and Sociological Bases of Special Education (Irregular) A study of the basic philosophical and sociological bases for current practices in special education. education.
CIED6433 Legal Aspects of Special Education (Irregular) A study of litigation and legislation in special education, federal and state laws and court cases, and due process hearings.
CIED6443 Advanced Research in Curriculum and Instruction (Irregular) A study in the planning, implementation, and evaluation of research in special education.
CIED6503 Effective Teaching: Concepts and Processes (Sp, Su, Fa) This course is designed to assist students in examining a variety of effective teaching practices and conditions found in classrooms and in acquiring knowledge, concepts, and ideas about ways to effectively influence the interests, learning and development of students. Prerequisite: admission to the Ph.D. program.
CIED6603 Multicultural Education (Sp, Su, Fa) This course is designed to trace, examine, discuss, and promote understanding of issues related to multicultural education, different views of multicultural education, and the impact of multicultural education upon the schooling process. Emphasis is upon schooling experiences of culturally diverse students, language issues, gender issues, and evaluation issues. Prerequisite: admission to the Ph.D. program.
CIED660V Workshop (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
CIED674V Internship (Sp, Su, Fa) (1-6) May be repeated for 6 hours.
CIED694V Special Topics (Sp, Su, Fa) (1-6) Discussion and advanced studies on selected topics in curriculum and instruction. Specific focus on recent developments. May be repeated for 6 hours.
CIED695V Independent Study (Sp, Su, Fa) (1-6)
CIED699V Doctoral Seminar (Sp, Su, Fa) (1-3) May be repeated for 3 hours.
CIED700V Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy

DRAMA (DRAM)

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- Professors Brusstar, Gibbs, Gross, Herzberg
- Associate Professors Dwyer, Martin, Riha
- Assistant Professors Landman,Tyndall
- Instructor Leftwich

Degrees Conferred:

M.F.A. (DRAM)

The Master of Fine Arts in Drama provides a course of advanced studies within the areas of acting, directing, design, and playwriting. It aims to develop in students a high level of understanding and competence in the chosen degree concentration, leading to professional-level employment in performance and design. Considered to be the terminal degree in the creative aspects of drama, the M.F.A. program provides a 60-hour concentration in a chosen specialty. The degree is awarded following successful fulfillment of a series of academic and performance/production requirements.

Prerequisites to the M.F.A. Program: A student entering graduate studies in the Department of Drama should have a minimum of 24 semester hours in undergraduate drama/theatre credit. In the event a student does not satisfy this requirement, the student and an adviser will assess the student's needs and establish a plan of study that will prepare the student for advanced degree work. The GRE may be required based on the student's undergraduate GPA in accordance with Graduate School policy.

Admission Procedures: In addition to complying with all Graduate School admission procedures, M.F.A. degree applicants will present an audition and/or portfolio for assessment and evaluation prior to consideration for acceptance.

Degree Requirements: The Master of Fine Arts degree requires 60 hours of approved graduate-level coursework that is focused in one of three study tracks: Performance (Acting and Directing), Playwriting, or Design. Specific course requirements and related production requirements are determined in conference with the particular track adviser. All students will produce a thesis (6 hours credit) prior to graduation. This thesis will take the form of a performance, design or playwriting project with appropriate written research and

documentation to support it. Both the proposed thesis project and the final product shall be subject to review and approval by the student's thesis committee.

Each student will be reviewed annually. Departmental faculty will determine whether sufficient progress has been made to warrant continuation into the subsequent year of study and eventual graduation.

A final examination will be administered to all graduating M.F.A. students. This examination will allow students to demonstrate their knowledge and understanding of theatre at a level appropriate to those who have reached the end of their particular course of studies.

All course credits presented for graduation must be graded "C" or better.

Up to 18 hours of credit may be waived for those students entering the M.F.A. program and already holding the M.A. degree in drama. However, a minimum of 42 hours of graduate-level courses and four regular semesters must be completed on the Fayetteville campus.

Departmental requirements may be waived by the faculty in drama only upon receipt of evidence of equivalent learning or skill resulting from earlier education or experience. Students not holding a bachelor's degree in drama may be required to take supplemental coursework and/or demonstrate proficiency in the creative areas of drama.

Dance (DANC)

DANC5003 Practicum in Using the Arts to Teach About Culture in Grades K - 6 (Su) Designed for the elementary classroom teacher, the course assists the student in creating meaningful pedagogical methods and materials to be used for introducing children to a variety of cultures.

Drama (DRAM)

DRAM406V Playwriting (Fa) (1-3) A workshop course for students who wish to attempt original work in the dramatic form. Prerequisite: junior standing. May be repeated for 9 hours.

DRAM4463 African American Theatre History — 1950 to Present (Sp) A chronological examination of African-American theatre history from 1950 to the present through the study of African-American plays and political/social conditions. Upon completion of this course the student should be familiar with the major works of African-American theatre and have a deeper understanding of American History. (Same as AAST 499V)

DRAM4653 Scene Design I (Odd years, Sp) Theory and practice in the art of scenic design, including historical and contemporary styles and procedures. Practical experience gained through work on departmental productions. Prerequisite: DRAM 1323, DRAM 1321L and DRAM 2313.

DRAM4773 Acting Shakespeare (IR) Work on the special techniques required for performance of the plays of special techniques required for performance of the plays of Shakespeare and his contemporaries. The cultural and theatrical context required for understanding the scripts. Special attention to the speaking of blank verse.

DRAM478V Theatre Workshop (Su) (1-6) Production of plays for public performance by all members of the workshop. Mornings are spent in instruction and laboratory work preparing sets, lighting, costumes, and properties. Afternoons are spent in instruction in acting and directing, rehearsal of plays in production. Special problems for graduate credit. Prerequisite: junior standing.

DRAM492V Internship (Irregular) (1-12) Supervised practice in the various arts and crafts of the theatre (e.g., full design responsibility for a box office management; actor apprenticeship in a professional company). Available only to those who have exhausted the regular curricular possibilities in the area of specialization. May be repeated for 12 hours.

DRAM4953 Theatre Study in Britain (Sp, Su, Fa) Study of the components of stage production through attending and critiquing a wide variety of classical, modern, and avant garde theatre productions in England; includes tours of London and historical British sites and seminars with British theatre artists.

DRAM5123 Theatrical Design Rendering Techniques (Sp, Su, Fa) Investigation of drawing and painting methods and materials useful to theatrical designers. Integration of graphic communication with overall production conceptualization will be explored through examination of various theatre styles and periods.

DRAM5143 History of Decor for the Stage (Even Years, Sp) An overview of architectural decoration and its application to theatrical design from the Predynastic Period (4400-3200 B.C.) through the Art Deco period with references to contemporary decor. Prerequisite: graduate standing.

DRAM5153 Scene Painting (Su) A studio class in painting techniques for the theatre. Problems in color, texture, style and execution with appropriate analysis and research documentation. Graduate level project required.

DRAM5163 Theatre Graphics and Technology (Irregular) Advanced study of theatre drafting, drawing and rendering techniques and model making. Graduate level project portfolio required.

DRAM5213 Costume Design (Odd, Fa) Advanced study of the art and practice of stage costume design. Emphasis on the expression of character through costume. Development of rendering and research skills. Portfolio development.

DRAM5243 Costume Technology I (Odd Years, Sp) Advanced methods of costume construction techniques and the practice of theatrical pattern drafting will be explored through project work.

DRAM5253 Costume Technology II (Even Years, Sp) Advanced study in methods of costume construction and pattern making techniques with emphasis on tailoring, draping, corsetry and costumes crafts as determined by student needs. Prerequisite: DRAM 3243 and DRAM 5243.

DRAM5263 Costume Shop Management (Irregular) Comprehensive study of costume shop management including physical space, equipment, personnel, budget and time management techniques. Practical application through actual production experience in the University Theatre.

DRAM5323 Stage Lighting II (Irregular) Entry level class for graduate study in lighting. Emphasis on lighting design and analysis, lighting for dance and musical theatre, equipment as it relates to the designer. Graduate level project required.

DRAM5333 Lighting III (Sp, Su, Fa) Advanced study of design, technology and production development collaboration involved in lighting at the professional level. Theatre, screen and architectural venues will be examined. Dance, musical theatre, legitimate drama and related lighting situations will be explored through class projects and laboratory exercises. Prerequisite: graduate standing.

DRAM5353 Stage Lighting Technology (Sp, Su, Fa) The thorough examination of the technology of equipment that supports the art of stage lighting design: theory, operating principles and specification of lamps, fixtures, control systems and special effect hardware will be explored. Prerequisite: graduate standing.

DRAM5363 Theatre Planning (Irregular) A study of significant theatre buildings, modern and historical, and their relationship to contemporary theatre planning. Practical application of theory through design problems and evaluation. Graduate level research project/paper required.

DRAM5373 Theatre Management (Irregular) Comprehensive study of arts management including personnel, budget, audience development, operations and organization for professional, academic and community theatre and related performance areas. Practical application through actual production experience in the University Theatre. Graduate level research paper required.

DRAM5403 Acting/Directing Theories (Sp, Su, Fa) Examination of the major forms of acting and directing techniques and theories. Practical application through analysis and scene work, with students functioning as both director and actor throughout the course. Prerequisite: graduate standing.

DRAM5413 Graduate Acting Principles (Sp, Su, Fa) An intensive study and practical application of acting techniques. Emphasizes the integration of the physical, emotional, and intellectual life of the character through work on monologues, scenes and exercises. Prerequisite: Graduate standing in Drama.

DRAM5432 Graduate Stage Speech (Sp, Su, Fa) Focus will be on enabling the body's natural breathing mechanism to provide strong vocal support. Freedom from unnecessary tension, resonance, articulation and vocal hygeine will also be explored as they relate to clear vocal production. Prerequisite: Graduate standing. May be repeated for 4 hours.

DRAM5443 Graduate Acting: Period Styles (Sp) Styles of acting in relation to French and English Dramatic Literature (16th-19th Centuries). This course also examines the historical and cultural influences that shaped each genre. A period dance component is included. Prerequisite: Graduate standing in Drama.

DRAM5453 Musical Theatre Performance (Sp, Su, Fa) Theory and techniques of performing a singing role for the theatre. Integrates acting and vocal techniques and examines the relationship between score and text. Prerequisite: Graduate standing in Drama.

DRAM5463 Audition Techniques (Sp, Su, Fa) A thorough study and practical application of audition skills and techniques. This course will equip the student with prepared audition pieces and experience in cold reading, on-camera work, and improvisation. The course also explores the practical needs of the actor; from how to get an audition to how to prepare a resume. Prerequisite: Graduate standing in Drama.

DRAM5473 Graduate Acting: Shakespeare (Sp, Su, Fa) Analysis of Shakespeare for performance. Work will include the plays of Shakespeare and his contemporaries, including cultural and theatrical contexts required for understanding the scripts. Prerequisite: Graduate standing in Drama.

DRAM5503 Research Techniques in Drama (Fa) Basic techniques of research and study in the fields of Drama and Theatre with consideration of the necessary interplay of intellectual and intuitive skills in mature artistry. Practice in the logical, semantic, and evidential work of scholarship and in the various research methodologies.

DRAM5513 Graduate Playwriting: Realism (Sp, Su, Fa) Advanced theory and technique in playwriting emphasizing the realistic mode. Explorations into the manner of expression, plotting the action, and revealing multiple levels of meaning. May be repeated for 6 hours.

DRAM5523 Graduate Playwriting: Non-Realism (Sp, Su, Fa) Advanced theory and technique in playwriting emphasizing non-traditional playwriting styles such as Expressionism, Surrealism, Epic Theatre and the American Musical. Prerequisite: graduate standing.

DRAM5533 Graduate Playwriting: Special Projects (Sp, Su, Fa) Advanced study and practice in the area of playwriting. The area of concentration will be determined by the student's specific writing project(s). Prerequisite: graduate standing. May be repeated for 6 hours.

DRAM558V New Script Ensemble (Sp, Su, Fa) (1-3) An interdisciplinary course for designers, actors, directors, and playwrights. An exploration of techniques and strategies for approaching the new script and realizing the distinctive elements pertinent to developing the new work. Prerequisite: graduate standing.

DRAM5613 Graduate Directing Principles (Sp, Su, Fa) Theory and technique of directing realistic drama: script analysis; spatial considerations of composition and picturization; development in production of the Aristotelian concepts of plot, character, thought, diction, music (sound), and spectacle. Prerequisite: graduate standing.

DRAM562V Seminar in Dramatic Art (Sp, Su, Fa) (1-9) Research, discussion and

projects focusing on a variety of topics including theatre management, advanced acting methods, and specialized periods in dramatic literature. Prerequisite: senior or graduate standing. May be repeated for 9 hours.

DRAM5633 Graduate Directing: Non-Realism (Sp, Su, Fa) Theory and techniques of directing in non-realistic modes. Scene study in the areas of Classical Drama, Expressionism, Epic Theatre, Epic Realism and contemporary staging methods. Prerequisite: Graduate standing in Drama.

DRAM5643 Dramaturgy (Irregular) To define the dramaturge's role in theatrical production and to introduce students to working models of structural and dramaturgical analysis. Also to teach the application of these analytical models to various genres of dramatic literature. Prerequisite: graduate standing.

DRAM5653 Directing II (Sp, Fa) Advanced techniques of stage direction. Prerequisite: DRAM 3653 and graduate standing.

DRAM5723 History of the Theatre I (Fa) A comprehensive study of the theatre in different cultures and ages, as an institution, as an art, and as a vision of life.

DRAM5733 History of the Theatre II (Sp) A continuation of DRAM 5723.

DRAM5753 History of the Theatre III (Sp) An examination of history and theory of modern theatrical styles. Prerequisite: senior or graduate standing.

DRAM5763 Dramatic Criticism (Fa) Analysis of critical theories from Aristotle to the present; interrelationships of theatre disciplines as well as the influence of the church, state, and press on dramatic criticism. Prerequisite: senior or graduate standing.

DRAM581V Theatre Production III (Sp, Su, Fa) (1-3) Participation in the process of production for the University Theatre mainstage at a supervisory level. Areas of involvement may include scenery, lighting, sound, makeup, marketing, etc. May be repeated for 6 hours.

DRAM590V Independent Study (Sp, Su, Fa) (1-3) Individually designed and conducted programs of reading and reporting under guidance of a faculty member.

DRAM591V Special Topics (Sp, Su, Fa) (1-3) Classes not listed in the regular curriculum, offered on demand on the basis of student needs and changes within the profession. Prerequisite: Graduate standing in Drama or Instructor consent required. May be repeated for 99 hours.

DRAM592V Internship (Irregular) (1-6) Supervised practice in the various arts and crafts of the theatre (e.g. full design responsibility for a production; box office management; actor apprenticeship in a professional company).

DRAM600V Master's Thesis (Sp, Fa) (1-6) Prerequisite: graduate standing.

ECONOMICS (ECON)

See Graduate School of Business, page 187.

EDUCATION AND HEALTH PROFESSIONS, COLLEGE OF (EDUC)

See Graduate Faculty in Education

Degrees Conferred:

Ed.S., Ed.D. (EDUC)

The Educational Specialist degree is undifferentiated but has five areas of specialization: counselor education, educational administration, elementary education, higher education, and secondary education. For requirements concerning the Educational Specialist see page 40.

The Doctor of Education degree is undifferentiated but has five areas of specialization: adult education, educational administration, recreation, higher education, and vocational education.

General requirements concerning the degree of Doctor of Education are on page 41.

Additional details relating to these programs may be found in program area sections.

The University of Arkansas is accredited by the National Council for Accreditation of Teacher Education to offer both undergraduate and graduate programs through the doctorate for the preparation of elementary and secondary school teachers and school service personnel including administrators. The College of Education and Health Professions is also a member of the American Association of Colleges for Teacher Education.

EDUCATIONAL ADMINISTRATION (EDAD)

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- Associate Professors Elliott, Holt
- Assistant Professor Kimbrell
- Visiting Assistant Professor Gooden
- Executive-in-Residence Carnine

Degrees Conferred:

M.Ed. (EDAD)
Ed.S., Ed.D. (EDUC)

Areas of Concentration: Graduate programs in Educational Administration are designed to prepare qualified persons for a variety of leadership roles. Areas of concentration include: 1) principalships and other school-site administrative and supervisory positions; 2) superintendents and other central administrative personnel; 3) federal and state governmental positions in education; and 4) the educational administration professoriate.

Primary Areas of Faculty Research: School bond elections; school leadership; school board/community relations; academically distressed schools; educational policy; school finance litigation; school finance; effective schools; rural schools; data analysis; educational research.

Prerequisites for Acceptance to the Program: In addition to meeting University requirements for admission to the Graduate School, all candidates seeking admission to any educational administration program must complete program application procedures, which include submission of proof of a currently valid teaching certificate and three supporting letters of recommendation. All educational specialist and doctoral applicants must submit a Miller Analogies or Graduate Record Examination score, an autobiographical sketch and writing sample, and evidence of a minimum of two years of professional experience. An interview with members of the educational administration faculty to demonstrate compatibility of program course offerings with the applicant's goals and interests is required.

Requirements for the Master of Education Degree: (Minimum 33 hours.) The master's degree in Educational Administration is designed primarily to provide professional preparation for students seeking administrative positions in elementary and secondary schools. The 33 graduate semester-hour program (or 27 hours and a thesis) includes a minimum of 24 graduate semester hours of course work in Educational Administration (including an internship), and 9 semester hours of required College of Education and Health Professions core courses.

Requirements for the Educational Specialist Degree: The specialist degree program in Educational Administration is designed primarily to provide professional preparation for students involved in school-site administration and those individuals who have district-wide administrative responsibilities.

The specialist degree program requires completion of a minimum of 30 graduate semester hours with the number of actual credit hours a function of the previous educational background of each student and his or her goals. This includes 15 semester hours in educational administration core courses, 6 semester hours of adviser-approved

electives, 3 semester hours of district-level internship (or equivalent experience), 3 semester hours of a specialist project, and 3 semester hours in statistics or research. If not previously satisfied, all students must also complete 24 semester hours of prerequisite course work in educational administration and 9 semester hours of the College of Education and Health Professions common core.

Requirements for the Doctor of Education Degree: The doctor of education degree in educational administration requires the completion of a minimum of 96 graduate semester hours. Each student's program of study includes a minimum of 54 hours in educational administration (18 semester hours from a common doctoral core and satisfaction of M.Ed. and Ed.S. Educational Administration core courses or their equivalent), a minimum of 9 semester hours in courses outside of Educational Administration, 9 hours in research and statistics, and a minimum of 18 hours of dissertation.

Educational Administration (EDAD)

EDAD5013 School Organization and Administration (Irregular) Analysis of structure and organization of American public education; fundamental principles of school management and administration.
EDAD5023 The School Principalship (Sp, Su) Duties and responsibilities of the public school building administrator; examination and analysis of problems, issues, and current trends in the theory and practice of the principalship.
EDAD5053 School Law (Irregular) Legal aspects of public and private schooling: federal and state legislative statues and judicial decisions, with emphasis upon Arkansas public education.
EDAD5063 School Personnel Administration and Supervision (Irregular) Principles, processes, and procedures of school personnel management, supervision, and staff development.
EDAD5093 Effective Leadership in School Settings (Sp, Su, Fa) Strategic planning, group facilitation and decision making, organizational behavior and development, professional ethics and standards, principles of effective educational leadership.
EDAD5163 Current Educational Issues (Irregular) Current problems, issues, and trends facing school administrators in Arkansas and the nation.
EDAD574V Internship (Sp, Su, Fa) (1-6) Supervised in-school/district experiences individually designed to afford opportunities to apply previously-acquired knowledge and skills in administrative workplace settings. May be repeated for 3 hours.
EDAD599V Seminar (Irregular) (1-6) May be repeated for 6 hours.
EDAD600V Master's Thesis (Sp, Su, Fa) (1-6)
EDAD6023 School Facilities Planning and Management (Irregular) School facilities planning, management, cost analysis, operations, and maintenance of the school plant.
EDAD6053 School-Community Relations (Irregular) Community analysis, politics and education; power groups and influences; school issues and public responses; local policy development and implementation; effective communication and public relations strategies.
EDAD605V Independent Study (Sp, Su, Fa) (1-3)
EDAD6093 School District Governance: The Superintendency (Irregular) Analysis of the organizational and governance structures of American public education at national, state, and local levels.
EDAD6103 School Finance (Irregular) Principles, issues and problems of school funding formulae and fiscal allocations to school districts.
EDAD6173 School Business Management (Irregular) Fiscal and resource management in public schools: budgeting, insurance, purchasing, and accounting.
EDAD6333 Advanced Fiscal and Legal Issues in Education (Irregular) The examination and discussion of advanced legal and fiscal issues affecting public school education. Prerequisite: advanced graduate standing.
EDAD6503 Topics in Educational Research for School Administration (Irregular) Application of educational research in the school setting by educational administrators. Emphasis placed on the use of state and local school or district data, data analysis, interpretation and reporting, hands-on experience with SPSS, and the formal process of writing a research report. Prerequisite: advanced graduate standing.
EDAD6523 Advanced Application of Educational Leadership (Irregular) A review of seminal and current works on leadership as applied to the educational setting. Provides knowledge of classic and contemporary strategies for leadership.
EDAD6533 Educational Policy (Irregular) Examination of the research and theory related to the evolution of local, state, and federal governance and educational policy. Emphasis given to the consideration of procedures involving policy formulation, implementation, and analysis.
EDAD6563 Educational Administration and Human Behavior (Irregular) Examination of research and theory related to the utilization of human resources with educational organizations.
EDAD660V Workshop (Sp, Su, Fa) (1-6) May be repeated for 6 hours.
EDAD674V Internship (Sp, Su, Fa) (1-6) May be repeated for 6 hours.
EDAD680V Educational Specialist Project (Sp, Su, Fa) (1-6) An original project, research project, or report required of all Ed.S. Degree candidates. Prerequisite: admission to the Ed.S. program.
EDAD690V Directed Readings in Educational Administration (Sp, Su, Fa) (1-3) Selected readings from classical books and authors in the field.
EDAD699V Seminar (Irregular) (1-6) Prerequisite: advanced graduate standing. May be repeated for 6 hours.
EDAD700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

EDUCATIONAL FOUNDATIONS (EDFD)

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- Professors Denny, Lucas, Mulvenon, Stegman
- Associate Professor Turner

Degree Conferred:

M.S., Ph.D. (EDFD)

Graduate Certificates Offered:

Educational Program Evaluation
Educational Measurement
Education Policy Studies
Educational Statistics and Research Methods

Areas of Concentration: Research Methods and Policy Studies. The degree program develops professionals in the areas of educational research methods and policy studies, both through courses and independent research. Graduates can obtain employment with school districts, educational agencies, and industries with internal data analysis needs.

Prerequisites for Acceptance to the Master of Science Program: In addition to meeting University requirements for admission to the Graduate School, applicants must have earned a bachelor's degree with at least a 2.75 cumulative GPA and a combined score of at least 1000 on the verbal and quantitative sections and a 3 on the writing section of the Graduate Record Examinations.

Requirements for the Master of Science Degree: Graduates are required to satisfy the requirements of the Graduate School for a Master of Science degree. The degree requires 30 hours, consisting of these required courses (18 hours):

EDFD 5013 Research Methods in Education
EDFD 5353 Philosophy of Education
EDFD 5373 Psychological Foundations of Teaching & Learning
EDFD 5393 Statistics in Education and Health Professions
EDFD 5653 Educational Assessment
EDFD 5683 Issues in Educational Policy
One course from the following (3 hours):
EDFD 5303 Historical Foundations of Modern Education
EDFD 5473 Adolescent Psychology in Education
EDFD 5573 Life-Span Human Development

In addition to the courses listed, students are also required to complete these independent research requirements (9 hours):

EDFD 599V Research Practicum (3 hours)
EDFD 600V Master's Thesis (6 hours)
and pass a comprehensive examination.

Prerequisites for Acceptance to the Graduate Certificate Programs: In addition to meeting University requirements for

admission to the Graduate School, applicants must have earned a master's degree with a 3.25 cumulative GPA and scores of at least 500 on both the quantitative and verbal sections of the Graduate Record Examinations OR be currently enrolled in a doctoral program at the University of Arkansas.

Certificate Requirements: 18 semester hours from the list of courses for a certificate with a grade-point average of 3.50.

Graduate Certificate in Educational Program Evaluation: The graduate certificate in Educational Program Evaluation recognizes students who take a concentrated core of courses focused on systematic and rigorous evaluation of educational programs and policies. Students who earn this certificate have a working knowledge of qualitative and quantitative evaluation procedures and can use these to plan, conduct, and report on evaluations.

Program of Study:
EDFD 6403 Educational Statistics and Data Processing
EDFD 6413 Experimental Design in Education
EDFD 6613 Evaluation of Policies, Programs, and Projects
EDFD 6533 Qualitative Research
EDFD 699V Seminar: Survey Research Methods
One course from the following (3 hours):
EDFD 6423 Multiple Regression Techniques for Education
EDFD 6453 Applied Multivariate Statistics
EDFD 6543 Advanced Qualitative Research
EDFD 6653 Measurement and Evaluation
EDFD 699V Seminar (approved by EDFD faculty)

Graduate Certificate in Educational Measurement: The graduate certificate develops professionals in the areas of measurement, testing, and assessment, through courses in the area of instrument development and research design. Graduates can obtain employment with educational agencies and industries with assessment and research analysis needs.

Program of Study:
EDFD 5653 Educational Assessment
EDFD 6403 Educational Statistics and Data Processing
EDFD 6653 Measurement and Evaluation
EDFD 699V Seminar: Advanced Measurement and Evaluation
One course from the following (3 hours):
EDFD 6613 Evaluation of Policies, Programs, and Projects
EDFD 699V Seminar: Survey Research Methods
And one course from the following (3 hours):
EDFD 6413 Experimental Design
EDFD 6423 Multiple Regression Techniques for Education

Graduate Certificate in Education Policy Studies: The graduate certificate in Education Policy Studies recognizes students who take a concentrated core of courses focused on education policy and public policy. Students who earn this certificate develop a framework for studying issues in public policy and education policy, examine how education policy is developed and implemented, and learn methods for evaluating programs and policies.

Program of Study:
EDFD 6403 Educational Statistics and Data Processing
EDFD 5683 Issues in Educational Policy
EDFD 6613 Evaluation of Policies, Programs, and Projects
EDFD 6993 Seminar: Economics of Education
EDAD 5053 School Law
PLSC 5163 Public Policy

Graduate Certificate in Educational Statistics and Research Methods: The graduate certificate in Educational Statistics and Research Methods recognizes students who complete a core of courses focused on developing theoretical, application, and interpretative aspects of statistical techniques and research methods. Graduate students completing this certificate will also develop comprehensive programming and data management skills necessary for today's academic researcher.

Program of Study:
EDFD 6403 Educational Statistics and Data Processing
EDFD 6413 Experimental Design
EDFD 6423 Multiple Regression
EDFD 6453 Multivariate Statistics
One course from the following (3 hours):
EDFD 5653 Educational Assessment
EDFD 6653 Measurement and Evaluation
And one course from the following (3 hours):
EDFD 699V Advanced Statistics Seminar: Structural Equation Modeling
EDFD 699V Advanced Statistics Seminar: Exploratory Data Analysis
EDFD 699V Advanced Statistics Seminar: Categorical Data Analysis
EDFD 699V Advanced Statistics Seminar: Approved by EDFD Faculty

Doctor of Philosophy in Educational Foundations: Educational Statistics and Research Methods: The increased emphasis on educational accountability and data-driven decision making to improve public school institutions, as well as greater reliance on empirical research and analysis in public policy and educational studies, have led to a greater need for experts in educational statistics and research methods. The Educational Foundations doctoral program develops professionals who can lead in these areas through coursework and independent research in educational statistics, research design, assessment, and program evaluation.

Admission Requirements for the Ph.D. Degree: In addition to meeting University requirements for admission to the Graduate School, applicants should have an earned master's degree with a minimum 3.25 GPA, GRE-Verbal of 550, GRE-Quantitative of 550, and GRE-Writing of 3.5. Higher scores in one area can compensate for lower scores in another area.

Requirements for the Ph.D. Degree: Students must complete all requirements of the Graduate School for the Doctor of Philosophy degree, and complete an approved program of study including a minimum of 36 credit hours of core courses, 9 hours of elective courses, and 18 credit hours of doctoral dissertation. Coursework must be completed with a cumulative grade average of at least 3.25, with no credit for courses with a grade of "C" or lower.

Required Courses:
36 Hours of Core Courses
EDFD 5373 Psychological Foundations of Teaching & Learning
EDFD 5683 Issues in Educational Policy
EDFD 6403 Educational Statistics and Data Processing
EDFD 6413 Experimental Design in Education
EDFD 6423 Multiple Regression Techniques for Education
EDFD 6453 Applied Multivariate Statistics
EDFD 6513 Advanced Experimental Design
EDFD 6523 Advanced Multiple Regression
EDFD 6533 Qualitative Research
EDFD 6553 Advanced Multivariate Statistics
EDFD 6613 Evaluation of Policies, Programs and Projects
EDFD 6653 Measurement and Evaluation
9 Hours of Elective Courses from the following:
EDFD 5653 Educational Assessment
EDFD 6993 Seminar: Advanced Topics in Measurement
EDFD 6993 Seminar: Categorical Data Analysis
EDFD 6993 Seminar: Exploratory Data Analysis
EDFD 6993 Seminar: Structural Equation Modeling
EDFD 6993 Seminar: Survey Research Methods
Other Math Department and Quantitative Courses approved by EDFD Faculty
18 hours of EDFD 700V Doctoral Dissertation

Educational Foundations (EDFD)

EDFD5013 Research Methods in Education (Sp, Su, Fa) General orientation course which considers the nature of research problems in education and the techniques used by investigators in solving those problems. Prerequisite: graduate standing.
EDFD5303 Historical Foundations of Modern Education (Sp, Su) Critical analysis and interpretation of the historical antecedents of contemporary education, focusing upon the American experience from the colonial period to the present.
EDFD5323 Global Education (Irregular) Comparative and global analysis of international education with emphasis on cultural education and implications for the future.
EDFD5353 Philosophy of Education (Irregular) Introduction to the method and attitude essential to effective analysis and interpretation of issues and values within a society reflecting cultural, ethnic, gender, and global diversity. Prerequisite: graduate standing.
EDFD5373 Psychological Foundations of Teaching and Learning (Irregular) Psychological principles and research applied to classroom learning and instruction. Social, emotional, and intellectual factors relevant to topics such as readiness, motivation, discipline, and evaluation in the classroom.
EDFD5393 Statistics in Education and Health Professions (Sp, Su, Fa) Applied statistics course for Master's degree candidates. Includes concepts and operations for frequency distributions, graphing techniques, measures of central tendency and variation, sampling, hypothesis testing, and interpretation of statistical results.
EDFD5473 Adolescent Psychology in Education (Irregular) Study of the adolescent experience with emphasis on the unique psychological problems and tasks of this developmental stage; role of educators in the facilitation of crises resolutions in social, personal and institutional conflicts. Prerequisite: graduate standing.
EDFD5573 Life-Span Human Development (Sp, Su, Fa) Basic principles of development throughout the human life-cycle. Physical, cognitive, social, emotional, and personality development.
EDFD5653 Educational Assessment (Irregular) Introduction to measurement issues and basic test theory. Focus on types and usage of assessment tools, data management, and analysis and interpretation of educational data. Practical training in the utilization and interpretation of academic achievement data in Arkansas.
EDFD5683 Issues in Educational Policy (Sp, Su, Fa) This course examines how K-12 education policy is designed and implemented in the United States. Students will develop a working knowledge of policymaking frameworks to examine major education policies of current interest and debate key policy issues that arise at each level of government.
EDFD599V Seminar (Irregular) (1-6) May be repeated for 6 hours.
EDFD600V Master's Thesis (Sp, Su, Fa) (1-6) May be repeated for 6 hours.
EDFD605V Independent Study (Sp, Su, Fa) (1-6)
EDFD6223 Educational Futurism (Irregular) An integrative, holistic analysis and assessment of potential alternative futures to guide current educational practice. Prerequisite: graduate standing and history or philosophy of education.
EDFD6403 Educational Statistics and Data Processing (Sp, Su, Fa) Theory and application of frequency distributions, graphical methods, central tendency, variability, simple regression and correlation indexes, chi-square, sampling, and parameter estimation, and hypothesis testing. Use of the computer for the organization, reduction, and analysis of data (required of doctoral candidates). Prerequisite: EDFD 5013 or equivalent.
EDFD6413 Experimental Design in Education (Sp) Principles of experimental design as applied to educational situations. Special emphasis on analysis of variance techniques used in educational research. Prerequisite: EDFD 6403 or equivalent.
EDFD6423 Multiple Regression Techniques for Education (Fa) Introduction to multiple regression procedures for analyzing data as applied in educational settings, including multicollearity, dummy variables, analysis of covariance, curvi-linear regression, and path analysis. Prerequisite: EDFD 6403.
EDFD6453 Applied Multivariate Statistics (Sp) Multivariate statistical procedures as applied to educational research settings including discriminant analysis, principal components analysis, factor analysis, canonical correlation, and cluster analysis. Emphasis on use of existing computer statistical packages. Prerequisite: EDFD 6413.
EDFD6513 Advanced Experimental Design (IR) Advanced topics of the general linear model, including hierarchical linear modeling and longitudinal analysis with a focus on developing the mathematical and theoretical basis for these methods. Prerequisite: EDFD 6413.
EDFD6523 Advanced Multiple Regression (IR) Advanced topics of correlational research methods, including logistic regression and path analysis with a focus on developing the mathematical and theoretical basis for these advanced methodological designs. Prerequisite: EDFD 6423.
EDFD6533 Qualitative Research (Sp, Fa) Introduction of non-quantitative methods, including data collection through interviews, field observation, records research, internal and external validity problems in qualitative research. Prerequisite: EDFD 6403.
EDFD6543 Advanced Qualitative Research (Sp) Preparation for the conduct of qualitative research, structuring, literature reviews, data collection and analysis, and reporting results. Prerequisite: EDFD 6533. May be repeated for 6 hours.
EDFD6553 Advanced Multivariate Statistics (IR) Builds on the foundation provided in Multivariate and introduces techniques that extend methodological elements of canonical, discriminant, factor analytic, and longitudinal analyses, providing the mathematical and theoretical foundations necessary for these designs. Prerequisite: EDFD 6453.
EDFD6613 Evaluation of Policies, Programs, and Projects (Fa) Introduction to evaluation in social science research, including why and how evaluations of programs, projects, and policies are conducted; includes analysis of actual evaluations in a variety of disciplines.
EDFD6623 Techniques of Research in Education (Sp, Su) Use of scientific method in attacking educational problems. Emphasis placed on the planning and design of research studies, collection of reliable and valid data, sampling methods, and analysis and interpretation of data. (Required Prerequisite: EDFD 6403.
EDFD6653 Measurement and Evaluation (Irregular) Fundamentals of measurement: scales, scores, norms, reliability, validity. Test and scale construction and item analysis. Standardized measures and program evaluation models in decision making. Prerequisite: EDFD 6403.
EDFD668V Practicum in Research (Irregular) (1-6) Practical experience in educational research on campus, in school systems, or in other agencies in educational program development.
EDFD699V Seminar (Irregular) (1-6) Prerequisite: advanced graduate standing. May be repeated for 6 hours.

EDUCATIONAL LEADERSHIP, COUNSELING, AND FOUNDATIONS (ELCF), DEPARTMENT OF

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- Professors Denny, Farley, Gearhart, Greenwood, Hammons, Lucas, Miller, Mulvenon, Stegman
- Associate Professors Elliott, Holt, Murphy, Murry, Newgent, Turner
- Adjunct Associate Professor Brazzell
- Assistant Professors Brescia, Kimbrell, Kissinger, Lee
- Visiting Assistant Professor Gooden
- Instructors Cohen, Stephen

Degrees Conferred:

M.Ed. in Educational Administration (EDAD)
(See Educational Administration)
M.Ed. in Educational Technology (ETEC)
(See Educational Technology)
M.Ed. in Higher Education (HIED) (See Higher Education)
M.S. in Counseling (CNSL) (See Counselor Education)
M.S. in Educational Foundations (EDFD)
(See Educational Foundations)
Ed.S. in Education (EDUC) (See Counselor Education, Educational Administration, or Higher Education)
Ed.D. in Education (EDUC) (See Educational Administration or Higher Education)
Ph.D. in Counselor Education (CNED) (See Counselor Education)
Ph.D. in Educational Foundations (EDFD)
(See Educational Foundations)

Graduate Certificates Offered:

Building-Level Administration (non-degree) (under review)
District-Level Administation (non-degree) (under review)
Educational Program Evaluation (non-degree)(EDEV)
Educational Measurement (non-degree) (EDME)
Education Policy Studies (non-degree) (EDPO)
Educational Statistics and Research Methods (non-degree) (EDST)

EDUCATIONAL TECHNOLOGY (ETEC)

Roy C. Farley
Head, Department of Educational Leadership, Counseling and Foundations
234 Graduate Education Building
479-575-4207
E-mail: rfarley@uark.edu

Cheryl Murphy
Program Coordinator
349 Graduate Education Building
479-575-4207
E-mail: cmurphy@uark.edu

Web: http://www.uark.edu/depts/coehp/ETEC/etec.htm/

- Associate Professor Murphy
- Assistant Professor Brescia
- Instructor Cohen

Degree Conferred:

M.Ed. (ETEC)

The Educational Technology Program prepares students for professional positions as educational technologists of education, business, government, and the health professions.

Prerequisites to Degree Programs: Applicants for the M.Ed. degree must have completed a bachelor's degree and earned a 2.70 GPA in all undergraduate course work or obtained an acceptable score on the Graduate Record Examinations or Miller Analogies Test.

Requirements for the Master of Education Degree: In addition to the general requirements of the Graduate School, students must complete a minimum of 33 hours of graduate course work to include 24 semester hours in educational technology courses;
9 hours from the College of Education and Health Professions common core are required.

Educational Technologies (ETEC)

ETEC5062 Teaching and Learning with Computer-based Technologies (Su) Provides students admitted to the Master of Arts in Teaching (M.A.T.) program with the information and experience needed to use computer-based teaching technologies to meet instructional objectives in content area classrooms. Prerequisite: ETEC 2003.

ETEC5063 Practicum in Educational Technology (Irregular) Provides practical experiences in educational technology. Prerequisite: graduate standing and 15 credit hours completed in educational technology.

ETEC5103 Instructional Systems Analysis and Design (Irregular) A basic level instructional analysis and design course. Students demonstrate knowledge of specific behavioral, social, and cognitive learning strategies that significantly influence the analysis, design, and evaluation of instructional technology products. Prerequisite: graduate standing.

ETEC5183 Internet in the K-12 Classroom (Irregular) This course prepares teachers to be informed consumers of Internet technology; plan appropriate and effective Internet activities for their learners; and understand their responsibilities regarding electronic media, communications, and the Internet in the classroom. Prerequisite: graduate standing.

ETEC5203 History & Systems of Instructional Technology (Sp, Su, Fa) Provides learners with a comprehensive survey of the major trends, issues, people, processes, and products that have significantly affected the evolution of the field of educational technology.

ETEC5213 Introduction to Educational Media (Sp, Su, Fa) Instruction in selecting, utilizing and evaluating instructional materials and equipment. Prerequisite: graduate standing.

ETEC5233 Teaching Educational Technology (Fa) Provides practical experience in teaching educational courses. Prerequisite: graduate standing.

ETEC5243 Instructional Design Theory & Models (Fa) A study of the instructional development process as it pertains to the design and production of instructional materials which use modern technologies. Goal analysis, objectives, evaluation, instructional strategy development, production of an educational product, and revision of the instructional materials are considered. Prerequisite: graduate standing.

ETEC5253 Information Technologies in Education (Irregular) An intensive examination of the role of telecommunications and distance education technologies and their implications for educational practice. Emphasis is on telecommunications, and distance education technologies in classroom environments.

ETEC5263 Grant Writing in Instructional Technology (Sp, Su, Fa) Students will have an opportunity to find grant funding sources, write a grant, and submit an actual grant proposal to an agency for consideration. Will survey research in instructional medial over the past 60 years and learn specific criteria for reading and evaluating research reports and articles. Will investigate current issues and topics related to research and grant writing in instructional media.

ETEC5273 Advanced Design of Educational Media (Su, Fa) Instruction in the planning and local production of instructional materials. Prerequisite: ETEC 5213.

ETEC528V Field Experiences in Educational Technology (Irregular) (3-6) Field experience in educational technology settings. Prerequisite: graduate standing and 6 hours of graduate work in educational technology.

ETEC5293 Critical Evaluation of Educational Films (Su) A critical analysis of selected educational films with emphasis on the selection and evaluation process. Appropriate for media specialists, curriculum supervisors, librarians, administrators, classroom teachers and others involved in the purchasing, selection and/or utilization of educational films. Prerequisite: ETEC 5213 or equivalent.

ETEC5303 Learning with Computers in K-12 Classrooms (Irregular) This course is a study of how technology can be used to support current theories of learning. Students enrolled in the course will be required to learn about various learning theories and technologies as well as develop projects that utilize technology and current learning theories. Prerequisite: graduate standing.

ETEC5313 Principles in Visual Literacy (Sp, Su, Fa) Provides participants with a sense of how visual images can be employed in the teaching process. The use of black and white photography, darkroom techniques, and color slide photography are vehicles for studying the use of visual images in education.

ETEC5323 Computers as an Instructional Technology (Sp) An advanced course in the creation and evaluation of computer courseware for educational purposes. Emphasis is given to instructional design principles as they relate to computer education.

ETEC5333 Teaching on the Internet (Irregular) This course illustrates the issues and processes involved in the creation, administration, and maintenance of online course materials. Emphasis is placed on the acquisition of knowledge concerning online instruction, the quality of instruction materials produced, and the ability to work with and teach a faculty member about online instruction. Prerequisite: graduate standing and Web Development Experience.

ETEC5343 Assessment & Evaluation in Instructional Technology (Sp, Su, Fa) Provides learners with a comprehensive survey of the major assessment and evaluation techniques used in the system design and evaluation. Techniques range from needs assessment through summative evaluation.

ETEC5353 Production of CD ROM Media (Irregular) This course illustrates the processes involved in the creation and production of multi-media CD-ROM project. It provides students with the experience of collaboratively designing, developing, and producing a large scale multimedia CD-ROM project. Emphasis is placed on teamwork, quality of instructional materials produced, and the utilization of various technologies. Prerequisite: ETEC 5273. May be repeated for 3 hours.

ETEC5363 Distance Learning (Irregular) This course covers important aspects of the distance learning, course design and teaching. The course will link theory to practice by investigating theory and examining research that undergirds practice, examining and analyzing current practice, proposing practice standards, and discussing issues related to learners in distance duction environments. May be repeated for 3 hours.

ETEC5373 Introduction to Web Design (Irregular) This course covers the important aspects of the web design process as carried out in many educational environments. The course will include theory to undergird practice, examination and analysis of current practice, proposal of practice standards, and discussion of issues related to learners in this new medium. May be repeated for 3 hours.

ETEC5383 Issues in Web Design (Fa) This course covers important aspects of the Web design process as carried out in many educational environments. In this seminar we will be focusing on nonprofit educaitonal environments. This course will include theory to undergird practice, examination and analysis of current practice, proposal of practice standards, and discussion of issues related to learners in nonprofit settings. Prerequisite: graduate standing.

ETEC560V Workshop (Irregular) (1-18) This course is designed to enhance the established educational technology curriculum by providing students with special topic content and classroom experiences under the guidance of a faculty member. Prerequisite: graduate standing. May be repeated for 99 hours.

ETEC574V Internship (Sp, Su, Fa) (1-6) A supervised field placement in educational technology that provides experience consistent with the student's professional goals and training emphasis. Internship experiences are planning and directed under the guidance of a faculty member. On-campus and on-site supervision is required. Prerequisite: graduate standing. May be repeated for 6 hours.

ETEC599V Seminar (Irregular) (3-6) This course is designed to enhance the established educational technology curriculum by providing students with special topic content and classroom experiences under the guidance of a faculty member. Prerequisite: graduate standing. May be repeated for 6 hours.

ETEC600V Master's Thesis (Sp, Su, Fa) (1-6)

ETEC605V Special Problems in Educational Technology (Sp, Su, Fa) (1-6) Individually designed and conducted studies of educational technology under the guidance of a faculty member. Negotiated learning contract with supervising faculty required before enrollment. On-campus supervision required. Prerequisite: graduate standing. May be repeated for 6 hours.

ETEC6223 Strategic Planning and IDT Programs (Sp, Su, Fa) The course offers readings and experiences intended to develop strategic planning knowledge, values, attitudes, and skills in future instructional design and technology leaders. Topics covered include strategic planning and leadership.

ETEC6253 Information Technologies in Education (Irregular) An intensive examination of the role of telecommunications and distance education technologies and their implications for educational practices. Emphasis is on techniques of development, utilization and evaluation of telecommunication and distance education technologies in classroom environments. Prerequisite: ETEC 5213.

ETEC6393 Issues and Trends in Instructional Design and Technology (Irregular) Critical challenges posed as a result of the increasing infusion of technology into the school and training environments are explored. The course prepares students to make and defend policy decisions and become conversant with current trends and issues in the field. Prerequisite: ETEC 5213.

ETEC699V Seminar (Irregular) (1-6) The seminar is designed to provide advanced graduate students with an opportunity to explore topics related to instructional design in educational and training environments. Prerequisite: graduate standing.

ELECTRICAL ENGINEERING (ELEG)

William D. Brown
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- Distinguished Professors Brown (W.D.), Varadan (V.K.), Varadan (V.V.), Yeargan
- Adjunct Distinguished Professor Salamo
- University Professor Schmitt
- Professors Ang, Balda, Manasreh, Mantooth, Martin, Naseem, Schaper, Sohraby
- Adjunct Professors Malshe, Selvam, Ulrich
- Adjunct Research Professors Derryberry, Fink, Friedman, Funaki, Gipprich, Hefner, Kendall, Leniham, Ozpineci, Sculley, Vickers, Wang, Woodward, Zhu
- Associate Professors Barlow, Brown (R.L.), Burkett, El-Shenawee, Gattis, McCann
- Adjunct Associate Professors Parkerson, Thompson, Xiao
- Assistant Professors Burgers, Lee
- Adjunct Assistant Professors Bajwa, Di

Degrees Conferred:

M.S.E.E. (ELEG)
M.S.Tc.E. in Telecommunications Engineering (TCEG)
M.S.E., Ph.D. in Engineering (ENGR) (See Engineering)

Primary Areas of Faculty Research: Design, modeling, and testing of analog, digital, and mixed signal circuits; computer aided design (CAD); microelectronics, including solid state physics, processing, integrated circuit design, solar cells, semiconductor nanostructures; III-nitride growth, materials and devices; semiconductor materials for optoelectronic applications; electronic packaging, sensors, smart materials and structures and micro electro mechanical (MEMs) systems; telecommunications, including wireless communications and computer networking; microwave design; microwave imaging; radar and computational electromagnetics; power electronics, including design of motors and generators, motor controls, and power distribution; control systems and motion control; embedded control systems; sensor networks; digital signal processing and image processing; computer architecture and microprocessors; neural networks and pattern recognition; embedded systems; computer communications networks; neuroelectronics and neurosurgery.

Requirements for Graduate Degrees: In addition to the requirements of the Graduate School and the College of Engineering, the following departmental requirements must be satisfied by candidates for advanced degrees in electrical engineering:

1. Candidates for the Master of Science degree who present a thesis are required to complete a minimum of 24 semester hours of course work and six semester hours of thesis.
2. Candidates for the Master of Science degree who do not present a thesis are required to complete a minimum of 36 semester hours of course work.
3. Course work presented for the degree of Master of Science must include ELEG 5801 and a minimum of 12 semester hours at the 5000- or 6000-level in electrical engineering. At least 15 (24 for non-thesis option) hours of the student's graduate course work must be ELEG courses. No more than six hours of ELEG 588V may be presented for degree credit.
4. The program of study for the Ph.D. degree must satisfy the following:
   a. If the student does not have an M.S. degree, a minimum of 48 hours of course work (excluding dissertation hours) beyond the bachelor's degree must be presented in the Ph.D. program. If the student has an M.S. degree, a minimum of 48 hours of course work (excluding thesis and dissertation hours) must be presented in the combined M.S. and Ph.D. programs..
   b. A student should file a Declaration of Intent stating his or her intention to become a doctoral candidate at the beginning of the doctoral program. A minimum of 24 hours of the course work specified in item (a) must be completed after filing a Declaration of Intent.
   c. The course work specified in item (a) must include a minimum of 30 hours of course work at the 5000 and 6000 level, and at least 24 of these 5000- and 6000-level hours must be in electrical engineering.
   d. The course work specified in item (a) must include a minimum of nine hours in a coherent set of courses in a related subject area approved by the student's advisory committee. This subject area must be different from the focus of the student's dissertation research.
   e. The course work specified in item (a) must include ELEG 6801.
   f. The doctoral program must include at least 30 thesis and/or dissertation hours. A maximum of six of these hours may be thesis hours. The remaining 24 hours must be dissertation.
   g. It is emphasized that the course work specified in items (a) and (b) represent minimums and many students' programs will include more than this minimum, particularly if the student has an M.S.E.E. degree from a school that is not a recognized graduate school in the United States.
5. Attendance at both ELEG 5801 and ELEG 6801 seminar series is required of all graduate students in electrical engineering.
6. Candidates for the M.S.E.E. and M.S.Tc.E. degrees must take an M.S. Readiness Assessment exam during their first semester of graduate work. This exam is administered by the student's major professor and advisory committee, and is designed to assess the student's undergraduate preparation for his or her graduate work. The student's advisory committee may require the student to take whatever undergraduate courses it deems necessary in addition to the graduate courses specified in items 1-3.
7. Other conditions as stipulated in departmental guidelines for master's and doctoral degrees. Candidates for the Master of Science in Telecommunications Engineering must have completed courses in Digital Signal Processing (ELEG 3133 and ELEG 3131L or equivalent), Electromagnetics (ELEG 3703 or equivalent), and Data Structures (CENG 2143 or equivalent). Or the candidate's committee will assign one course in each of these areas that must be completed as part of the candidate's degree program. Candidates with non-ABET accredited B.S. degrees must satisfy the same deficiencies as students pursuing the M.S.E.E. degree. Further, all candidates must complete the courses:
   ELEG 5613 Introduction to Telecommunication
   ELEG 5643 Computer Communication Networks

A Certificate of Achievement in Electronics Manufacturing is available for students seeking a graduate degree in an engineering discipline.

Electrical Engineering (ELEG)

ELEG4203 Semiconductor Devices (Irregular) Crystal properties and growth of semiconductors, energy bands and charge carriers in semiconductors, excess carriers in semiconductors, analysis and design of p/n junctions, analysis and design of bipolar junction transistors, and analysis and design of field-effect transistors. Prerequisite: MATH 3404.
ELEG4223 Design and Fabrication of Solar Cells (Irregular) Solar insolation and its spectral distribution; p-n junction solar cells in dark and under illumination; solar cell

parameters efficiency limits and losses; standard cell technology; energy accounting; design of silicon solar cells using simulation; fabrication of designed devices in the lab and their measurements.

ELEG4233 Introduction to Integrated Circuit Design (Irregular) Design and layout of large scale digital integrated circuits using NMOS and CMOS technology. Topics include MOS devices and basic circuits, integrated circuit layout and fabrication, dynamic logic, circuit design, and layout strategies for large scale NMOS and CMOS circuits. Prerequisite: ELEG 3213.

ELEG4243 Analog Integrated Circuits (Irregular) Theory and design techniques for linear and analog integrated circuits. Current mirrors, voltage to base emitter matching, active loads, compensation, level shifting, amplifier design techniques, circuit simulation using computer-assisted design programs. Prerequisite: ELEG 3223.

ELEG4273 Electronics Manufacturing Processes (Irregular) Introduction to manufacturing processes and concurrent engineering in the electronics industry. Survey of electronics components and products and the processes of fabrication and assembly. Principles of design, productivity, quality, and economics. Emphasis on manufacturability. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: ELEG 3903 or ELEG 2103. (Same as INEG 4513)

ELEG4283 Mixed Signal Test Engineering I (Irregular) Overview of mixed signal testing, the test specification process, DC and parametric measurements, measurement accuracy, tester hardware, sampling theory, DSP-based testing, analog channel testing, digital channel testing. Prerequisite: senior or graduate standing.

ELEG4293 Mixed-Signal Modeling & Simulation (Irregular) Study of basic analog, digital & mixed signal simulation solution methods. Modeling with hardware description languages. Use of state-of-the-art simulators and HDLs. Prerequisite: ELEG 3223

ELEG4323 Switch Mode Power Conversion (Irregular) Basic switching converter topologies: buck, boost, buck-boost, Cuk, flyback, resonant; pulse-width modulation; integrated circuit controllers; switching converter design case studies; SPICE analyses of switching converters; state-space averaging and linearization; and switching converter transfer functions. Prerequisite: ELEG 3223 and ELEG 3123.

ELEG4403 Control Systems (Irregular) Mathematical models of control systems. Performance criteria and stability. Zigler-Niclos, root-locus, and frequency-rsponse design techniques. Special topics. Credit may be for either ELEG 4403 or MEEG 4213. Prerequisite: ELEG 3123. (Same as CENG 4403,MEEG 4213)

ELEG4463L Control Systems Laboratory (Irregular) Experimental study of various control systems and components. The use of programmable logic controllers in the measurement of systems parameters, ladder-logic applications, process-control applications, and electromechanical systems. Prerequisite: ELEG 4403.

ELEG4503 Electric Power Distribution Systems (Irregular) Design considerations of electric power distribution systems, including distribution substations, primary and secondary circuits. Distribution transformer and capacitor applications, voltage regulation, and distribution system protection. Prerequisite: ELEG 3303.

ELEG4513 Power System Analysis (Irregular) Equivalent circuit representation of power transmission lines. Development of power transmission network equations including symmetrical component method for unbalanced 3-phase circuits. Introduction to the problems of load flow, fault analysis, and transient stability. Prerequisite: ELEG 3123 or ELEG 3903.

ELEG4523 Introduction to Power Electronics (Irregular) Power electronic systems, power semiconductor switches, generic power electronic converters: line-frequency diode rectifiers, line-frequency phase-controlled rectifiers and inverters, switch-mode inverters, and zero-voltage and zero-current switching resonant inverters (e.g., resonant and actively-clamped resonant dc-link inverters). Prerequisite: ELEG 3123 and ELEG 3223.

ELEG4533 Fundamentals of Electromagnetic Compatibility in Power Electronics (Irregular) EMI, EMC basics, EMI sources, differential- and common-mode EMI, EMI/EMC Standards, EMI Measurements, EMI/EMC Solutions. Prerequisite: ELEG 3223. Pre- or Corequisite: ELEG 3303.

ELEG4603 Deterministic Digital Signal Processing System Design (Irregular) Design of Digital Signal Processing systems with deterministic inputs. Sampling, quantisizing, oversampling, ADC trade-offs, distortion, equalizers, anti-aliasing, coherency, frequency domain design, audio and video compression. Prerequisite: ELEG 3133.

ELEG4623 Communication Systems (Irregular) Various modulation systems used in communications. AM and FM fundamentals, pulse modulation, signal to noise ratio, threshold in FM, the phase locked loop, matched filter detection, probability of error in PSK, FKS, and DPSK. The effects of quantization and thermal noise in digital systems. Information theory and coding. Prerequisite: ELEG 3143.

ELEG4683 Introduction to Image Processing (Irregular) Introduction to the basic concepts of image processing; theory and applications. Covers digital methods of image restoration; reformation, extraction and analysis. Corequisite: Drill component.

ELEG4713 Electromagnetic Transmission (Irregular) Steady state and transient response of lossless and dissipative transmission lines. Wave guides and resonators. Antennas and radiation. Prerequisite: ELEG 3703.

ELEG4723 Introduction to RF and Microwave Design (Irregular) An introduction to microwave design principles. Transmission lines, passive devices, networks, impedance matching, filters, dividers, and hybrids will be discussed in detail. Active microwave devices will also be introduced. In addition, the applications of this technology as it relates to radar and communications systems will be reviewed. Prerequisite: ELEG 3703.

ELEG487VH Honors Special Topics in Electrical Engineering (Irregular) (1-3) Consideration of current electrical engineering topics not covered in other courses. Prerequisite: senior standing. May be repeated for 6 hours.

ELEG487V Special Topics in Electrical Engineering (Irregular) (1-3) Consideration of current electrical engineering topics not covered in other courses. Prerequisite: senior standing. May be repeated for 6 hours.

ELEG4933 Minicomputer Applications (Irregular) Structure, implementation, and application of minicomputer systems. Microcomputer hardware. Microprogramming. Minicomputer software technology. Design and evaluation of minicomputer systems. Corequisite: Drill component. Prerequisite: CENG 1123 or CSCE 1123.

ELEG4943 Digital Systems Design (Irregular) Number systems and codes, fundamentals of switching algebra, analysis and design of sequential switching circuits and memory elements. Prerequisite: junior standing.

ELEG4963 Field Programmable Gate Array Laboratory (Irregular) Implementation of digital logic and state machine designs with field programmable gate arrays. Emphasis is on the use of CAD tools for design and synthesis. Corequisite: Lab component.

ELEG4983 Introduction to Computer Architecture (Irregular) Design of a single board computer including basic computer organization, memory subsystem design, peripheral interfacing, DMA control, interrupt control, and bus organization. (Same as CENG4213) Prerequisite: ELEG 3923. (Same as CENG 4213)

ELEG5113 Stochastic Digital Signal Processing System Design (Irregular) Design elements and trade-offs of stochastic DSP systems. Linear prediction, adaptive filters, parametric spectral analysis, and speech applications. Design examples, random signal basics, spectral decomposition, and noise. Prerequisite: ELEG 3133 and ELEG 3143.

ELEG5153 Real-Time Data Acquisition Systems (Irregular) The theory and practice associated with taking measurements of the real world for use with computers. Sampling and data analysis techniques. Prerequisite: ELEG 3923.

ELEG5163 Advanced Microcontroller Design Project (Irregular) Use of development systems as an aid to microcontroller design; the student is expected to design, build, and test a microcontroller-based system to perform a specified task. Corequisite: Lab component. Prerequisite: ELEG 3923.

ELEG5173L Digital Signal Processing Laboratory (Irregular) Use of DSP integrated circuits. Lectures, demonstrations, and projects. DSP IC architectures and instruction sets. Assembly language programming. Development tools. Implementation of elementary DSP operations, difference equations, transforms and filters. Prerequisite: ELEG 4603.

ELEG5183L DSP Digital Communications Laboratory (Irregular) Implementation of digital communication techniques in the Texas Instruments C30 processor. AM, FM, SSB, DSB modulation; data scramblers, bit error rate, PAM, QAM; echo cancellation, full-duplex modems. Pre- or Corequisite: ELEG 4623.

ELEG5193L Advanced DSP Processors Laboratory (Irregular) Familiarization with, and use of, advanced DSP processors. Parallel processor configurations, timing consideration, specialized programming techniques, and complex pipelines. Prerequisite: ELEG 5173L.

ELEG5213 Integrated Circuit Fabrication Technology (Irregular) Theory and techniques of integrated circuit fabrication technology; crystal growth, chemical vapor deposition, impurity diffusion, oxidation, ion implantation, photolithography and medullization. Design and analysis of device fabrication using SUPREM and SEDAN. In-process analysis techniques. Student review papers and presentations on state of the art fabrication and device technology. Prerequisite: ELEG 4203.

ELEG5233 Solid-State Electronics I (Irregular) Theoretical treatment of crystal structures and lattices, quantum and statistical mechanics, thermal properties of crystals, free-electron theory of metals and quantum theory of electrons in periodic lattices. Prerequisite: ELEG 4203 and PHYS 3614 and PHYS 3611L.

ELEG5253L Integrated Circuit Design Laboratory I (Irregular) Design and layout of large scale digital integrated circuits. Students design, check, and simulate digital integrated circuits which will be fabricated and tested in I.C. Design Laboratory II. Topics include computer-aided design, more indepth coverage of topics from ELEG 4233, and design of very large scale chips. Prerequisite: ELEG 4233 and ELEG 4203.

ELEG5263L Integrated Circuit Design Laboratory II (Irregular) Students test the I.C. chips they designed in I.C. Design Laboratory I and propose design corrections where needed. Topics include gate arrays, bipolar design, I2L, memory design, and microprocessor design. Prerequisite: ELEG 5253L.

ELEG5273 Electronic Packaging (Irregular) An introductory treatment of electronic packaging, from single chip to multichip, including materials, substrates, electrical design, thermal design, mechanical design, package modeling and simulation, and processing considerations. Credit can not be earned for both MEEG 5273 and ELEG 5273. Prerequisite: (ELEG 3213 or ELEG 3913) and MATH 3404. (Same as MEEG 5273)

ELEG5283 Mixed Signal Test Engineering II (Irregular) Focus calibrations, DAC testing, ADC testing, DIB design, Design for Test, Data Analysis, and Test Economics. Prerequisite: ELEG 4283.

ELEG5293L Integrated Circuits Fabrication Laboratory (Irregular) Experimental studies of silicon oxidation, solid-state diffusion, photolithographical materials and techniques, bonding and encapsulation. Fabrication and testing of PN diodes, NPN transistors and MOS transistors. Prerequisite: ELEG 5213.

ELEG5313 Power Semiconductor Devices (Irregular) Carrier transport physics; breakdown phenomenon in semiconductor devices; power bipolar transistors, thyristors, power junction field-effect transistors, power field-controlled diodes, power metal-oxide-semiconductor field-effect transistors, and power MOS-bipolar devices. Prerequisite: ELEG 4203.

ELEG5323 Semiconductor Nanostructures I (Irregular) This course is focused on the basic theoretical and experimental analyses of low dimensional systems encountered in semiconductor heterojunctions and nanostructures with the emphasis on device applications and innovations. Prerequisite: ELEG 4203 or Instructor Permission.

ELEG5333 Semiconductor Nanostructures II (Irregular) This course is a continuation of ELEG 5323 Semiconductors Nanostructures I. It is focused on the transport properties, growth, electrical and optical properties of semiconductor nanostructures, and optoelectronic devices. Prerequisite: ELEG 5323 or Instructor Permission.

ELEG5403 Systems Theory (Irregular) A unified state-space approach to continuous and discrete systems. System dynamics, local transition functions, reachability, observability, and global behavior of systems. Prerequisite: ELEG 4403.

ELEG5413 Stochastic Control Systems (Irregular) Optimal estimation and control of linear dynamic systems with uncertainties. Stochastic processes and models. Prediction, filtering, and smoothing. The Kalman filter, Wiener-Hopf equations, separation principle, and stochastic optimal control. Prerequisite: ELEG 4133.

ELEG5423 Optimal Control Systems (Irregular) Basic concepts, conditions for optimality, the minimum principle, the Hamilton Jacobi equation, structure and properties of optimal systems. Prerequisite: ELEG 4403.

ELEG5433 Digital Control Systems (Irregular) Signal processing in continuous-dis-

crete systems. System modeling using the z-transform and state-variable techniques. Analysis and design of digital control systems. Digital redesign for continuous control. Prerequisite: ELEG 4403.

ELEG5443 Nonlinear Systems Analysis and Control (Irregular) Second-order nonlinear systems. Nonlinear differential equations. Approximate analysis methods. Lyapunov and input-output stability. Design of controllers, observers, and estimators for nonlinear systems. Prerequisite: ELEG 4403 or MATH 5303.

ELEG5453 Adaptive Filtering and Control (Irregular) Models for deterministic systems. Parameter estimation. Adaptive control. Stochastic models. Stochastic state and parameter estimation. Adaptive control of stochastic systems. Prerequisite: ELEG 3143 and ELEG 4403.

ELEG5463 Chaotic Dynamical Systems (Irregular) Computer analysis of fixed and periodic orbits and bifurcations. Symbolic dynamics approach to chaotic systems with applications to convergence analysis of numerical algorithms and secure communications. Fractals with applications to image compression. Julia and Mandelbrot sets. Prerequisite: senior or graduate standing in Engineering, Math or Science.

ELEG5473 Intelligent Transportation Systems (Irregular) Engineering challenges in current surface transportation. The ITS concept. Review of current electrical, communication, and computer technologies. Applications to traffic surveillence, traveler information, traffic management, transit management, incident management, automatic toll collection and smart cars. Benefits to ITS. Prerequisite: senior or graduate standing in engineering.

ELEG5513 Electric Power Quality (Irregular) The theory and analysis of electric power quality for industrial and commercial power systems. Specific topics include: grounding, shielding, wiring considerations, instrumentation, site surveys and analysis, case studies, specification and selection of power system components, and recommended design and installation practice. Prerequisite: ELEG 3303 and MATH 3404.

ELEG5533 Power Electronics and Motor Drives (Irregular) V-1 characteristics of insulated Gate Bipolar Transistors (IGBTs) and MOS-controlled Thyristors (MCTs), design of driver and snubber circuits, induction-, permanent magnet-, and brushless dc-motor drives; and resonant inverters. Prerequisite: graduate standing or (ELEG 3223 and ELEG 3303).

ELEG5543 Communication Networks for Motion/Industrial Control (Irregular) An introduction to topics of current interest in motion control systems. Examples: Open Control Automation, RS 485 Communication and RS 232 Communication as related to motion control systems, Serial Real Time Communication Systems, Control Area Network, Embedded Controllers, Motion Control Applications. Prerequisite: ELEG 3303 or graduate standing.

ELEG5603 Wireless Data Communications (Irregular) Comprehensive course in the emerging field of wireless data communications. Focused on upper layer protocols for wireless data transmission. Topics include wireless cellular system infrastructures, wireless circuit data, wireless packet data, mobile IP, and various existing and soon-to-be available wireless data systems and technologies. Prerequisite: graduate standing.

ELEG5613 Introduction to Telecommunications (Irregular) Overview of public and private telecommunication systems; traffic engineering; communications systems basics, information technology, electromagnetics, and data transmission. Prerequisite: ELEG Graduate Standing or ELEG 3133. (Same as CENG 5613)

ELEG5623 Information Theory (Irregular) Continuous and discrete source and channel models, measure of information, channel capacity, noisy-channel coding theorem, coding and decoding techniques. Prerequisite: ELEG 3143 or ELEG 4623.

ELEG5633 Detection and Estimation (Irregular) Binary and multiple decisions for single and multiple observations; sequential, composite, and non-parametric decision theory; estimation theory; sequential, non-linear, and state estimation; optimum receiver principles. Prerequisite: graduate standing.

ELEG5643 Computer Communications Networks (Irregular) A study of various current data communication techniques used in the computer world. Concepts of digital communications theory as well as packets and protocols are studied. Prerequisite: CENG 2123

ELEG5653 Artificial Neural Networks (Irregular) Fundamentals of artificial neural networks, both theory and practice. Teaches basic concepts of both supervised and unsupervised learning, and how they are implemented using artificial neural networks. Topics include the perceptron, back propagation, the competitive Hamming net, self organizing feature maps, topological considerations, requirements for effective generalization, subpattern analysis, etc. Prerequisite: MATH 3403.

ELEG5663 Communication Theory (Even Years, Sp) Principles of communications. Channels and digital modulation. Optimum receivers and algorithms in the AWGN and fading channels. Coherent, non-coherent detectors and matched filters. Bounds on the performance of communications, and comparison of communications systems. Background in stochastic processes and probabilities, communication systems is desirable. Prerequisite: Graduate standing. May be repeated.

ELEG5673 Pattern Recognition (Irregular) Introduction to the basic concepts of pattern recognition, its theory and application. Subjects will include: trainable pattern classifiers, discriminant functions, parametric training methods, nonparametric training methods, feature selection, feature ordering, and cluster analysis. Prerequisite: ELEG 3143.

ELEG5683 Image Processing (Irregular) Concepts involved in the processing of digital images. Emphasis on image analysis, enhancement, and restoration. Both spatial and frequency domain approaches are presented. Prerequisite: working knowledge of statistics and a programming language.

ELEG5693 Wireless Communications (Irregular) Comprehensive course in fast developing field of wireless mobile/cellular personal telecommunications. Topics include cellular system structures, mobile radio propagation channels, etc. Prerequisite: graduate standing.

ELEG5713 Antennas and Radiation (Irregular) Radio frequency antennas, control of radiation patterns, antenna impedance and antenna feeding systems. Prerequisite: ELEG 3703.

ELEG5723 Advanced Microwave Design (Irregular) This course is an advanced course in microwave design building on the introduction to microwave design course. A detailed discussion of active devices, biasing networks, mixers, detectors, Microwave Monolithic Integrated Circuits (MMIC), and wideband matching networks will be provided. In addition, a number of advanced circuits will be analyzed. Prerequisite: ELEG 3703 and ELEG 4723.

ELEG5733 Remote Sensing Systems (Irregular) Analysis of remote sensors operating in 3 widely used EM spectral regions: Visible and near IR, thermal IR, and microwave. Emphasis on understanding generic types of remote sensors serving these spectral bands, their data products, and applications. Prerequisite: ELEG 3703 and ELEG 3123.

ELEG5743 Radar Systems (Irregular) Methods of discrimination and ambiguity in the measurement of range, angle and velocity. Analysis of search, tracking, MTI, SLAR, and SAR systems. Characterization of return from complex targets. Prerequisite: ELEG 3703.

ELEG5753 Satellite Communications & Navigation Systems (Irregular) Introduces satellite communications and navigation systems design including microwave transmission, satellite transponders, earthstation hardware, modulation and multiple access techniques, and satellite networks. Prerequisite: ELEG 3133 and ELEG 3703.

ELEG5763 Advanced Electromagnetic Scattering & Transmission (Irregular) Reflection and transmission of electromagnetic waves from a flat interface, the Poynting theorem, the complex and average power, the rectangular wave guides, TE and TM modes, radiation from antennas in free space and introduction to computational electromagnetics. Prerequisite: ELEG 3703.

ELEG5801 Graduate Seminar (Sp, Su, Fa) Papers presented by candidates for the Master of Science degree in electrical engineering on design problems, or new developments in the field of electrical engineering.

ELEG587V Special Topics in Electrical Engineering (Irregular) (1-3) Consideration of current electrical engineering topics not covered in other courses. Prerequisite: graduate standing. May be repeated for 3 hours.

ELEG588V Special Problems (Sp, Su, Fa) (1-6) Opportunity for individual study of advanced subjects related to a graduate electrical engineering program to suit individual requirements. May be repeated for 6 hours.

ELEG5913 Parallel Programming (Irregular) An analysis of parallel computer systems with respect to software engineering. Practical programming experience on pipelined, array, and multiprocessor computers. Credit can be earned in only one of these three courses. CSCE 5303 or ELEG 5913. Prerequisite: CSCE 4413 or equivalent.

ELEG5933 CAD Methods for VLSI (Irregular) Introduction to computational methods for the design and implementation of computer aided design (CAD) tools for digital systems engineering. The underlying theory of the tools is emphasized in addition to their application. Prerequisite: CENG 4213

ELEG5943 Computer Arithmetic Circuits (Irregular) Examination of fundamental principles of algorithms for performing arithmetic operations in computers. This course provides sufficient theoretical and practical information to prepare the digital design engineer with an awareness of basic techniques for the realization of arithmetic circuits. Pre- or Corequisite: Graduate standing. Corequisite: CENG 4213

ELEG5963 Computer Systems Optimization (Irregular) Design considerations and performance analysis of computer and communication systems modeling. Prerequisite: CSCE 4513.

ELEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

ELEG6213 Semiconductor Surfaces (Irregular) Semiconductor surfaces: Structure and reactivity of the surface, surface space-charge region, surface states, and scattering. Experimental methods, the MOS capacitance vs. voltage technique, current-voltage measurements, and photo-electric emission. Prerequisite: ELEG 5233.

ELEG6233 Solid State Electronics II (Irregular) Indepth theoretical treatment of semiconductor material and devices. Topics to be covered include carrier statistics, transport behavior, bulk material properties, junction characteristics and metal-semiconductor contacts. Prerequisite: ELEG 5233.

ELEG6273 Advanced Electronic Packaging (Irregular) An advanced treatment of electronic packaging covering a diverse range of packaging applications. Topics include packaging tradeoffs and decisions, design and CAD, assembly single-chip packaging, discrete and integrated passives, MEMS and optoelectronic packaging, RF and microwave packaging, multichip packaging, reliability, and economic considerations. Prerequisite: ELEG 5273. (Same as MEEG 6273)

ELEG6801 Graduate Seminar (Sp, Su, Fa) Papers presented by candidates for the Doctor of Philosophy degree in electrical engineering on current research or design problems in the field of electrical engineering.

ELEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

ELEMENTARY EDUCATION/READING (ELED/RDNG)

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- Associate Professors Collier, Gallavan
- Assistant Professors Eilers, Frevert, Kirkpatrick, Lincoln
- Instructors Cronan, Riggs

Degrees Conferred:

M.Ed. (ELED)
Ed.S. (EDUC)

Requirements for the Master of Education Degree: (Minimum 33 hours.) Candidates for the master's degree in elementary education must submit a score on the Miller Analogies Test or the Graduate Record Exam during the first twelve hours of course work and must complete a minimum of 33 hours of graduate course work: 21 hours from courses in elementary education (ELED) with 15 hours from five of the following nine areas – English as a second language (ESL), language arts, mathematics, science, children's literature, social studies, early childhood education, reading or general elementary education; 3 hours of electives; and 9 core hours, including EDFD 5013 Research Methods in Education and three hours from each of the areas listed below. The required research course (EDFD 5013) is to be taken during the first 12 hours of degree coursework. (The major adviser must approve all courses.)

1. EDFD 5373 Psych. Foundations of Teaching and Learning
   EDFD 5473 Adolescent Psychology in Education
   EDFD 5573 Life-Span and Human Development
2. EDFD 5303 Historical Foundations of Modern Education
   EDFD 5353 Philosophy of Education
   EDFD 5323 Global Education

All candidates who receive the master's degree in elementary education must pass the master's comprehensive examination. The M.Ed. is designed for experienced teachers who have the goal of expanding professional competence. The M.Ed. program does not meet requirements for state licensure. Students seeking state licensure should pursue enrollment in the M.A.T. program in Childhood Education (preK – Grade 4) or Middle Level Education (Grade 4 – Grade 8).

Elementary Education (ELED)

ELED600V Master's Thesis (Irregular) (1-6)
ELED605V Independent Study (Sp, Su, Fa) (1-18)
ELED680V Ed.S. Project (Sp, Su, Fa) (1-6)
ELED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

Teachers having the goal of improving professional competence in reading and of qualifying for the Arkansas Reading Specialist Licensure Endorsement, Grades P – 8 and 7 – 12 may take graduate courses in reading as part of their M.Ed. program. (For a listing of these and other CIED courses, See page 68.)

Reading (RDNG)

RDNG560V Workshop (Irregular) (1-18) May be repeated for 18 hours.
RDNG574V Internship (Irregular) (1-18)
RDNG605V Independent Study (Sp, Su, Fa) (1-6)

ENGINEERING, COLLEGE OF (ENGR)

Web: http://www.engr.uark.edu/

See Graduate Faculty in Engineering.

Degrees Conferred:

M.S.E., Ph.D. (ENGR)

The College of Engineering offers instruction in engineering leading to the degrees of Master of Science in Biological, Chemical, Civil, Computer, Electrical, Environmental, Industrial, Mechanical, and Transportation Engineering as well as a Master of Science in Operations Management and a Master of Science in Operations Research. Descriptions and requirements of these degree programs may be found under separate departmental headings. In addition, a Master of Science in Engineering (M.S.E.) degree is available for students who wish to take a broader range of courses than is usually permitted for the designated degrees listed above.

General Requirements for the Master of Science Degrees in the College of Engineering: In addition to the requirements of the Graduate School, the following requirements have been established by the College of Engineering for all Master of Science graduates:

1. Complete a minimum of 30 semester hours of graduate-level credit beyond the bachelor's degree. Up to six semester hours of thesis research can be used to satisfy the required 30 semester hours of credit by writing a thesis approved by the departmental faculty.
2. Satisfactorily pass a comprehensive examination.
3. Earn a minimum cumulative grade-point average of 3.00 on all graduate courses attempted. Departments may set higher grade standards and additional requirements.

Master of Science in Engineering Degree: The M.S.E. degree is available as a distance-delivered option. A Master of Science in Engineering (M.S.E.) degree is available for students who wish to take a broader range of courses than is usually permitted for the designated degrees listed in the previous paragraph or for those students who wish to pursue a curriculum emphasizing engineering management. Students in the M.S.E. degree program must select one of the following areas of emphasis:

Biological Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Engineering Management
Environmental Engineering
Industrial Engineering
Mechanical Engineering
Operations Research
Telecommunications Engineering
Transportation Engineering

Graduate courses in engineering are offered by the faculty of the College of Engineering at the University of Arkansas, Fayetteville, that will satisfy both the academic requirements and the 30-week residence requirement for the Master of Science in Engineering degree. These graduate courses are available through the Division of Continuing Education to students throughout Arkansas. This degree is awarded by the University of Arkansas, Fayetteville.

Prerequisites to the Master of Science in Engineering Degree: Students with a B.S. degree from any engineering program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology are normally accepted into the M.S.E. program without deficiencies. Other students are required to have credit for the basic mathematics (through differential equations), chemistry, and physics courses required for undergraduate degrees in engineering. Additional courses are usually required to resolve deficiencies in a student's preparation for graduate engineering courses.

Requirements for the Master of Science in Engineering Degree: The general minimum requirements of the Graduate School for Master of Science degrees must be met. The graduate faculty of the College of Engineering has established the following specific requirements for the Master of Science in Engineering degree:

1. Complete a minimum of 30 semester hours of graduate-level credit beyond the bachelor's degree. Up to six semester hours of

thesis research can be used to satisfy the required 30 semester hours of credit by writing a thesis approved by the departmental faculty.
2. Earn a minimum cumulative grade-point average of 3.00 on all graduate courses attempted. Minimum grades of "B" are required on 80 percent of the graduate hours taken for credit towards the M.S.E. degree.
3. Satisfactorily complete a comprehensive examination.

The program of study for each candidate will be determined by conference with the major professor and with advice from the candidate's graduate committee. Students pursuing a degree through the Center for Distance Learning will not be required to complete a thesis.

General Requirements for the Doctor of Philosophy Degree in Engineering

In addition to the requirements of the Graduate School, the following requirements have been established by the College of Engineering for all doctoral graduates:

1. All students must complete a minimum of 78 semester hours of graduate-level credit beyond the engineering bachelor's degree, including a minimum of 48 semester hours of course work and a minimum of 30 semester hours of dissertation research credits.
2. A minimum of 30 semester hours of course work must be at the graduate level (5000 or above).
3. Upon recommendation of the student's advisory committee, a student who has entered the Ph.D. program after a master's degree in engineering may receive credit for up to 30 semester hours. If the 30 hours includes master's thesis research, the advisory committee may credit up to 6 hours of thesis research toward the minimum dissertation research requirement.
4. Complete a minimum of nine semester credit hours of coursework in a set of coherent courses in a related subject area approved by the student's advisory committee.
5. Earn a minimum cumulative grade-point average of 3.0 on all graduate courses attempted.
6. Satisfactorily pass both a written and oral qualifying examination.
7. Complete and defend a dissertation on some topic in the student's major field of study.
8. Satisfactorily pass a final comprehensive oral examination.

Departments may set higher grade standards and additional requirements.

Major areas of study for the Doctor of Philosophy Degree in Engineering are as follows:

Biological Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Environmental Engineering
General Engineering
Industrial Engineering
Mechanical Engineering
Telecommunications Engineering
Transportation Engineering

The General Engineering area of study is designated for students pursuing a doctoral degree in an interdisciplinary area. Students choosing to pursue the General Engineering (or interdisciplinary) degree must have received a bachelor or master's degree from an ABET (or equivalent) accredited program. Students with a bachelor or master's degree from a non-ABET accredited engineering program must enroll in one of the discipline specific programs listed above. Students pursuing the General Engineering area of study will meet all course work and dissertation credit requirements as described above but the student's advisory committee will make all decisions relating to the student's program of studies and qualification examinations, subject to review and approval by the Dean of Engineering.

General Engineering (GNEG)

GNEG5003 Topics in Engineering for Teachers (Irregular) An introduction to engineering and technology concepts, as well as methods to conduct engineering and technology instruction. Intended for secondary school teachers during a summer workshop.

ENGLISH (ENGL)

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- Professors Adams (C.), Booker, Brinkmeyer, Burris, Candido, Cochran, DuVal, Giles, Hays, Heffernan, Jolliffe, Montgomery, Quinn, Talburt
- Associate Professors Hays, Kahf, Marren, Slattery, Stephens
- Assistant Professors Adams (R.), Brock, Bernhard Jackson, Cohen, Collins, McCombs, Tucker, Zuroski
- Adjunct Assistant Professor McCray
- Writer in Residence Gilchrist

Degrees Conferred:

M.A., Ph.D. (ENGL)
M.F.A. in Creative Writing (CRWR) (See Creative Writing)

Areas of Concentration: Master of Arts – history and criticism of literature in English; Master of Fine Arts – drama, fiction, poetry; Doctor of Philosophy – Medieval, Renaissance to 1660, Restoration and eighteenth century, nineteenth century, twentieth century; American literature to 1900, twentieth-century American literature; linguistics; and criticism.

Prerequisites to Degree Program: The following materials must be submitted to the Director of Graduate Studies, Department of English, by applicants to the M.A. and Ph.D. programs:

1. Application for Admission to Graduate Study in English. The form is available from the Director of Graduate Studies.
2. Graduate Record Examination scores on the Aptitude Test (verbal and quantitative) for applicants to the M.A. and Ph.D. programs. GRE score on the Advanced Test in Literature also required for applicants to the Ph.D. program.
3. Scores on other standardized tests, if available. TOEFL scores if applicable.
4. Complete transcripts of all undergraduate and graduate work.
5. Three letters of recommendation from former teachers, supervisors, or employers.

6. A writing sample, preferably a piece of literary criticism.

Requirements for the Master of Arts Degree: In addition to the general requirements of the Graduate School, the department stipulates that the following conditions be met:

1. Each master's candidate must present 30 hours of course work or 24 hours of course work and a thesis. Master's candidates intending to enter the Ph.D. program are required to choose the thesis option. The pedagogy course required of all teaching assistants will not count toward the 30 hours of course and/or thesis work. A maximum of one three-hour course at the 4000-level may be taken for credit; an additional three-hour course at the 4000-level may be taken for credit with permission of the Director of Graduate Studies. Each candidate must satisfy the department's course distribution requirement by taking the following courses:
   a. At least one three-hour course in critical theory or a course having a large theoretical component.
   b. At least two three-hour courses, in two of the following three areas: Medieval Literature and Culture; Renaissance Literature and Culture; Restoration and Eighteenth-Century British Literature and Culture.
   c. At least three three-hour courses, in at least three of the following five areas (at least one course must be in British literature and at least one course must be in American literature): Nineteenth-Century British Literature and Culture; Twentieth-Century British Literature and Culture; American Literature and Culture before 1900; Twentieth Century American Literature and Culture; World Literature and Culture in English.
   d. At least two seminars (which may overlap the above requirements).
2. Each master's candidate must demonstrate a reading knowledge of a language other than English that is relevant to the study of literature in English. French, German, Italian, Spanish, Russian, Ancient Greek, and Latin are the normally acceptable choices to meet the foreign language requirement, although other languages may be used with the approval of the Director of Graduate Studies. This requirement should be met as early as possible in the student's program of study, and in no case later than one week prior to the end of classes in the semester in which the student intends to graduate. (For details about how this requirement may be satisfied, see section two under "Requirements for the Doctor of Philosophy degree," below.)
3. Each master's candidate must have a cumulative GPA of at least 3.33 for the total number of hours presented for the degree. The grade point will be determined on the following scale: A, 4.00; A-, 3.66; B+, 3.33; B, 3.00; etc. The plus and minus ratings are recorded on the student's records in the Department of English only and do not appear on the official records in the Registrar's Office.
4. Each master's candidate must pass a comprehensive examination (non-thesis option) or a formal thesis defense.

Requirements for the Master of Fine Arts in Creative Writing: For a description of the requirements for the M.F.A. in creative writing, see page 81.

Requirements for the Doctor of Philosophy Degree: In addition to the general requirements of the Graduate School, the department stipulates that these requirements be met:

1. A student who begins doctoral study with an M.A. from another university or with an M.F.A. must take any courses required for the M.A. here which were not taken elsewhere, but these deficiency courses may, with the consent of the student's adviser, count toward the 24-hour course requirements.
2. Each doctoral candidate is required to demonstrate a reading knowledge of at least one language other than English that is relevant to the study of literature in English. French, German, Italian, Spanish, Russian, Ancient Greek, and Latin are the normally acceptable choices to meet the foreign language requirement, although other languages may be used with the approval of the Director of Graduate Studies. Doctoral candidates can meet this requirement by documenting that they have met a foreign language requirement at the University of Arkansas or another accredited M.A. program. This requirement should be met as early as possible in the student's program of study, preferably before registration for doctoral dissertation hours. Students who elect the medieval period as the field of specialization must also demonstrate a reading knowledge of Latin, Old English, and Middle English.

   For either the M.A. or Ph.D. degree, reading knowledge must be demonstrated in one of the following ways:
   a. The student passes a test of reading knowledge as administered through the Department of Foreign Languages and Literature or by a member of the faculty of another department in the University who is competent to assess reading knowledge in the given language. The Department of Foreign Languages administers testing either in conjunction with Ph.D. reading courses (course number 3063) in French, German, Latin, or Spanish; or through individual examinations. Students wishing to be examined in a foreign language should contact the Department of Foreign Languages well before the test to familiarize themselves with the different requirements of each language program.
   b. The student presents evidence of having completed the equivalent of one semester of graduate or upper-level undergraduate study in foreign language (in the given language) with a grade of "B" or above at an accredited college or university.
   c. The student documents that the language in question is his/her native language and that he/she has native fluency in the language.
3. By the time they take the candidacy examinations, students must have completed the Graduate School residence requirement and the departmental course requirements or be registered for courses, which, if passed, will complete these requirements.
4. To strengthen and support a field of specialization, each student may take up to six hours of graduate course work in other departments. Subject to the approval of the student's adviser, these hours will count toward the 24-hour course requirement for the degree.
5. Students in the doctoral program are required to complete 24 semester hours of course work for graduate credit beyond the M.A. degree. This work must include at least one course in critical theory and at least four seminar courses, at least one of which must be in the field of specialization.
6. With the consent of the Graduate Studies Committee, students will declare a field of specialization. This declaration will be made prior to the completion of the candidate's first year of doctoral studies; it must be made before arranging to take the written candidacy examinations. The field of specialization may be a period (Medieval, Renaissance to 1660, Restoration and Eighteenth-Century British, Nineteenth-Century British, Twentieth-Century British, American to 1900, Twentieth-Century American) or an area (Southern Literature and Culture, World Literature and Culture in English, American Multiculturalism, Gender Studies, Film and Media Studies, Literary Criticism and Theory, Popular Culture and Popular Genres, and Literary History). In conjunction with their committee and with the approval of the Director of Graduate Studies, students may propose additional fields if their particular projects do not fit within any of the suggested areas.
7. Students must notify the Director of Graduate Studies in the

department of their intention to take the candidacy examinations a month before the end of the term preceding the date of the examinations, which will be scheduled by the student in consultation with the committees administering the examinations. At the time they take the candidacy examinations, students must have a grade-point average of 3.50 for courses taken beyond the master's degree. The grade point will be on the following scale: A, 4.00; A-, 3.66; B+, 3.33; B, 3.00; etc. The plus and minus ratings are recorded on the student's record in the Department of English only and do not appear on the official record in the Registrar's Office.

8. Each student must pass the following candidacy examinations:
   a. A take-home written examination in the field of specialization.
   b. A three-hour oral examination on a specific topic within the student's broad field, approved jointly by the student and the exam committee. Students may retake only once any examination they fail.
9. Upon successfully completing the candidacy exams, each student must submit a dissertation proposal to be discussed and approved in a formal meeting with the student's dissertation committee.
10. Within the time limits specified by the Graduate School, each student must submit a dissertation acceptable to the student's dissertation committee.
11. Each student must pass a dissertation defense administered by the student's dissertation committee.

Secondary Emphasis in Rhetoric and Composition: Students earning the Doctor of Philosophy in English or the Master of Fine Arts in Creative Writing may choose Rhetoric and Composition as a field of secondary emphasis. Students who choose this option are required to do the following:

1. Take ENGL 5003 Composition Pedagogy, ENGL 5973 or 6973 Topics in Rhetoric and Composition, and ENGL 4003 English Language and Composition for Teachers or COMM 5303 Classical Rhetoric.
2. Teach five different writing courses offered by the English Department.
3. Pass a one-hour oral examination in the area.

English (ENGL)

ENGL4003 English Language and Composition for Teachers (Fa) Subject matter and methods of approach for the teaching of composition in high school.

ENGL4073 Film Writing Workshop (Irregular) A workshop in writing the screenplay with close attention given to student manuscripts and adaptations. Prerequisite: advanced standing.

ENGL4303 Introduction to Shakespeare (Sp, Su, Fa) Extensive reading in Shakespeare's comedies, histories, tragedies, and nondramatic poetry. (Same as ENGL 3653I)

ENGL4503 Introduction to Literary Theory (Irregular) A historical survey of literary theory from Plato onwards.

ENGL4533 Studies in Literature and Gender (Irregular) The study of a special topic involving literature and gender. Content varies. May be repeated.

ENGL4543 Studies in Literature and Mutliculturalism (Irregular) The study of literature and multiculturalism, with attention to particular themes, genres, authors, literary movements, historical moments, or other organizing principles. At least one major paper will be required. Content varies. May be repeated.

ENGL4563 Topics in Major Authors (Irregular) The concentrated study of works by one or more major authors. At least one major paper will be required. Content varies. May be repeated.

ENGL4603H Special Studies (IR) Concentrated study of a specific topical area related to literature and culture but not otherwise encompassed by the curriculum. Content varies. May be repeated.

ENGL4603 Special Studies (Irregular) Concentrated study of a specific topical area related to literature and culture but not otherwise encompassed by the curriculum. Content varies. May be repeated. May be repeated for 3 hours.

ENGL5003 Composition Pedagogy (Fa) Introduction to teaching college composition. Designed for graduate assistants at the University of Arkansas.

ENGL5013 Creative Writing Workshop (Irregular)

ENGL5023 Writing Workshop: Fiction (Irregular)

ENGL5033 Writing Workshop: Poetry (Irregular)

ENGL5043 Translation Workshop (Irregular) Problems of translation and the role of the translator as both scholar and creative writer; involves primarily the discussion in workshop of the translations of poetry, drama, and fiction done by the students, some emphasis upon comparative studies of existing translations of well-known works. Primary material will vary. Prerequisite: reading knowledge of a foreign language. (Same as FLAN 504V) May be repeated for 15 hours.

ENGL5063 Internship in Publishing (Irregular) Practical experience and instruction in copyediting and stylistics, promotional copywriting, and production. Conducted at the University of Arkansas Press and designed for students who plan careers in publishing. May be repeated for 6 hours.

ENGL507V Creative Non-Fiction Workshop (Irregular) (1-3) The theory and practice of the "New Journalism" with a study of its antecedents and special attention to the use of "fictional" techniques and narrator point of view to make more vivid the account of real people and real events.

ENGL5083 Professing Literature (Irregular) An introduction to the profession of literary scholarship and the teaching of literature at the college level.

ENGL510V Readings in English and American Literature (Irregular) (1-6) Open to Honors candidates and graduate students. May be repeated for 99 hours.

ENGL5143 English Teachers' Workshop: Literature (Irregular) Primarily for high school teachers of English. Review of principles of literary criticism, literary movements; intensive study of representation works from each genre.

ENGL5173 Studies in Medieval Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5183 The Structure of Present English (Sp) Structural analysis of the language.

ENGL5203 Introduction to Graduate Studies (Irregular) Students learn to carry out and report on literary research. Practical assignments introduce them to the reference collections, professional journals, and microform texts with which scholars work. Meanwhile, advanced explication and composition exercises work on perfecting the students' control over the design and style of the articles they write.

ENGL5223 Studies in Renaissance Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5233 Form and Theory of Translation (Irregular) An examination of the principal challenges that confront translators of literature, including the recreation of style, dialect, ambiguities, and formal poetry; vertical translation; translation where multiple manuscripts exist; and the question of how literal a translation should be. (Same as WLIT 5233)

ENGL5243 Special Topics (Irregular) Designed to cover subject matter not offered in other courses. May be repeated for 99 hours.

ENGL5263 Form and Theory of Fiction: I (Irregular) Such aspects of the genre as scene, transition, character, and conflict. Discussion is limited to the novel.

ENGL5273 Form and Theory of Poetry: I (Irregular) An examination of perception, diction, form, irony, resolution, and the critical theories of the major writers on poetry, such as Dryden, Coleridge, and Arnold.

ENGL5283 Form and Theory of Fiction: II (Irregular) Second part of the study of the techniques of fiction. Discussion is limited to the short story. Prerequisite: ENGL 5263.

ENGL5293 Form and Theory of Poetry: II (Irregular) Second part of the study of the techniques of poetry; independent study of a poet or a problem in writing or criticism of poetry. Prerequisite: ENGL 5273.

ENGL5303 Seminar in Restoration and Eighteenth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5313 Introduction to Literary Theory (Irregular) An advanced introductory survey of a number of theoretical approaches to literature.

ENGL5403 Studies in Nineteenth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5603 World Literature and Culture in English (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5623 The Bible as Literature (Irregular) The several translations of the Bible; its qualities as great literature; its influence upon literature in English; types of literary forms. (Same as WLIT 5623)

ENGL5633 English Drama from Its Beginning to 1642 (Irregular) Early forms, Tudor drama, Shakespeare's contemporaries, and Stuart drama to the closing of the theatres.

ENGL5653 Shakespeare: Plays and Poems (Irregular)

ENGL569V Seminar in Film Studies (Irregular) (1-9) Research, discussion; papers on a variety of film genres and areas including the new American film, the science-fiction film, directors, film comedy, the experimental film, criticism, the film musical. (Same as COMM 569V) May be repeated for 9 hours.

ENGL5703 Studies in American Literature and Culture Before 1900 (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5723 Studies in Literature and Culture of the American South (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5803 Studies in Twentieth-Century American Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5903 Studies in Twentieth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5923 Film and Media Studies (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.

ENGL5933 Studies in Popular Culture and Popular Genres (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated.

May be repeated for 12 hours.
ENGL5943 Studies in Criticism and Literary Theory (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL5953 Studies in Literary History (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL5973 Studies in Rhetoric and Composition (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6113 Seminar in Medieval Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6193 The Development of English (Fa) Intensive course in the fundamentals of linguistic study and their application to the history of English from prehistoric times to the present.
ENGL6203 Seminar in Renaissance Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6243 Seminar in Special Topics (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6443 Seminar in Nineteenth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6513 Seminar in Twentieth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6613 Seminar in World Literature and Culture in English (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6713 Seminar in Restoration and Eighteenth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6723 Seminar in American Literature and Culture Before 1900 (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6733 Seminar in Literature and Culture of the American South (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6803 Seminar in Twentieth-Century American Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6933 Seminar in Popular Culture and Popular Genres (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6943 Seminar in Literary Theory (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6953 Seminar in Literary History (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL6973 Seminar in Rhetoric and Composition (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated. May be repeated for 12 hours.
ENGL698V Master's Thesis (Sp, Su, Fa) (1-6)
ENGL699V Master of Fine Arts Thesis (Sp, Su, Fa) (1-6)
ENGL700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

ENTOMOLOGY (ENTO)

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- University Professors Meisch, Stephen
- Professors Johnson (D.T.), Kring, Lorenz, Luttrell, McLeod, Steelman, Steinkraus, Wiedenmann
- Associate Professor Szalanski
- Adjunct Professors Gold, Katayama, Teague, Thompson
- Curator Barnes
- Assistant Professors Goggin, Hopkins, Loftin, Studebaker
- Assistant Research Professor Bernhardt

Degrees Conferred:

M.S., Ph.D. (ENTO)

Primary Areas of Faculty Research: Pest management; insect pathology; veterinary/medical entomology; insect-plant interactions; arthropod-animal interactions; biological control; taxonomy; systematics; physiology; insect biology and insect ecology.

Prerequisites to Degree Program: Applicants for graduate degrees must meet all requirements for admission to the Graduate School. In addition, applicants are evaluated by the departmental admissions committee. Acceptance into the departmental program is based on grade-point average (GPA), letters of recommendation, résumé and whether a vacancy exists in the student's area of interest. Applicants must present Graduate Record Examination scores for the verbal, quantitative, and writing tests. To be accepted for the Master of Science degree, an undergraduate background in physical and biological sciences is essential. An undergraduate major in entomology is not required. A cumulative GPA of 3.00 is highly desirable.

To be accepted for work toward the Ph.D. degree, the student will normally have a master's degree from an accredited institution in entomology or a closely related field. A minimum cumulative GPA of 3.25 for courses taken at the graduate level is highly desirable. Applicants must present Graduate Record Examination scores for the verbal, quantitative, and writing tests.

Requirements for the Master of Science Degree: Students studying for the Master of Science degree with a limited undergraduate background in entomology may be expected to complete substantially more than the minimum number of credit hours (30) required for the degree. A thesis, reporting original research, and a final comprehensive oral examination are required.

Requirements for the Doctor of Philosophy Degree: A major requirement for the Ph.D. degree is a dissertation based on original research in some area of entomology. A "curriculum enrichment" program consisting of at least six hours in foreign languages, statistics, computer science, technical writing, or other similar subject matter approved by the student's graduate advisory committee and the head of the department is required. These hours are in addition to the usual prescribed course work. Written and oral candidacy examinations covering the student's program of study are required. A final oral examination over course work and in defense of the dissertation is required.

Entomology (ENTO)

ENTO4013 Insect Behavior and Chemical Ecology (Even years, Sp) Basic concepts in insect senses and patterns of behavioral responses to various environmental stimuli. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory/discussion 2 hours per week. Corequisite: Lab component
ENTO4024 Insect Diversity and Taxonomy (Fa) Principles and practices of insect classification and identification with emphasis on adult insects. Corequisite: Lab component.
ENTO4033 Immature Insects (Even years, Sp) Identification of immature forms of insects and their phylogentic relationships. Lecture 1 hour per week. Laboratory 2- two hour sessions per week. Corequisite: Lab component. Prerequisite: ENTO 4024.
ENTO4043 Apiculture (Odd years, Sp) Review of social behavior of insects and its exemplification in Honeybees. Previous knowledge of basic entomology is helpful but not required. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.
ENTO4053 Insect Ecology (Even years, Fa) To develop understanding of important ecological concepts through study of dynamic relationships among insects and their environment. To become familiar with the literature of insect ecology, and interpretation and critique of ecological research. Previous knowledge of basic entomology and/or ecology will be assumed. Corequisite: Lab component.
ENTO410V Special Topics (Irregular) (1-3) Special Topics course available to both undergraduate and graduate students, to address emerging issues and timely topics. This would supplement our graduate-only special topics course. May be repeated.
ENTO4123 Insect Pest Management I (Odd years, Sp) Study of principles and concept of insect pest management. Areas covered include survey of arthropod pests and damage, population dynamics, damage thresholds, physcological units, prediction models, surveillance, arthropod sampling, strategies and tactics utilized to maintain pest populations below economic injury levels. Prerequisite: ENTO 3013.
ENTO4133 Advanced Applied Entomology (Even years, Fa) A study of the most important pests of humans and their belongings. THe course topics include pest identification, biology, survey and sampling methods, computer models, economic injury levels and economic thresholds. Lecture 2 hours/week and laboratory 2 hours/week. Corequisite: Lab component. Prerequisite: ENTO 3013.
ENTO500V Special Problems (Sp, Su, Fa) (1-4) Prerequisite: graduate standing.

May be repeated for 4 hours.
ENTO5013 Morphology of Insects (Odd years, Fa) Origin, evolution, and functional significance of external insect structure. Structure and function of major internal systems. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component.
ENTO511V Special Topics (Irregular) (1-4) Topics not covered in other courses or a more intensive study of specific topics in entomology. Prerequisite: graduate standing. May be repeated for 99 hours.
ENTO5123 Biological Control (Even years, Fa) Theoretical and practical basis for biological control of arthropod pests and weeds via parasites, predators, and pathogens. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.
ENTO5133 Applied Molecular Genetics (Even years, SP) A hands on course in applied molecular genetic techniques used in agricultural research including molecular diagnostics and population genetics. Students will learn how to apply advanced molecular genetic methodologies and Internet database resources to the organism that they are using for their graduate research. Prerequisite: ANSC 3123.
ENTO600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
ENTO6071 Seminar (Sp, Fa) Fall: special topics not covered in regular course work. Spring: critical review of research papers in entomology. Seminar will be taken by graduate student majors for both semesters. May be repeated for 6 hours.
ENTO6113 Insect Physiology (Even years, Sp) General and comparative physiology of insects. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component.
ENTO6213 Insect Toxicology (Odd years, Sp) Toxicology of chemicals to insects and humans including techniques of testing collecting data, and factors that influence reactions to different classes of insecticides. Previous knowledge of organic physiological chemistry is helpful, but not required. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.
ENTO700V Doctoral Dissertation (Sp, Su, Fa) (1-8) Prerequisite: graduate standing.

ENVIRONMENTAL DYNAMICS (ENDY)

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Agricultural Economics and Agribusiness Faculty:
- Associate Professor Popp
- Instructor Hipp

Anthropology Faculty:
- University Professor Limp
- Professors Kay, Kvamme, Rose, Sabo, Ungar
- Associate Professors Mainfort, Plavcan
- Assistant Professor Casana

Arkansas Archeological Survey Faculty:
- Director Green

Geosciences Faculty:
- Distinguished Professor Stahle
- Professors Brahana, Dixon, Guccione, Hehr, Jansma, Mattioli, Paradise, Steele
- Associate Professors Boss, Davidson, Davis, Graff, Hays
- Assistant Professors Cothren, Tullis

Anthropology, Cooperating Faculty:
- Professor Schneider

Archeological Survey, Cooperating Faculty:
- Professor House
- Associate Professors Early, Jeter, Mitchem, Morrow, Stewart-Abernathy
- Assistant Professors Payne, Turbitt

Biological Engineering Faculty:
- Associate Professors Chaubey, Matlock

Biological Sciences, Cooperating Faculty:
- Professors James, Smith, Spiegel
- Research Professor Stephenson
- Associate Professors Beaupre, Sagers, Ziegler

Crop, Soil, and Environmental Sciences Cooperating Faculty:
- Professors Daniel, Rutledge
- Associate Professors Brye, Miller

Environmental Sciences Cooperating Faculty:
- Associate Professor Savin

Geosciences, Cooperating Faculty:
- Professor Zachry

History, Cooperating Faculty:
- Distinguished Professor West

Landscape Architecture, Cooperating Faculty:
- Professor Crone

Psychology, Cooperating Faculty:
- Professors Knowles, Schroeder

Rural Sociology, Cooperating Faculty:
- Professors Farmer, Voth

Degree Conferred:

Ph.D. (ENDY)

Environmental Dynamics is the study of complex interactions between natural systems and human activity. It requires an interdisciplinary research approach and integration with the power, efficiency, and economy of advanced computer-based technologies. Emphasis is placed upon the identification and interpretation of short-term and long-term cycles that underlie Earth-climate-human interactions. Primarily, the program is staffed by faculty from the departments of anthropology and geosciences and associated research institutes and laboratories including: the Archeo-Imaging Laboratory, the Arkansas Archeological Survey, the Arkansas Water Resources Center (AWRC), the Bio-archeology Laboratory, the Center for Advanced Spatial Technologies (CAST), the Earth Visualization Laboratory, Research Vessels Ozark Traveler and Ozark Explorer, the Tree-Ring Laboratory, and the Water Quality Laboratory. Faculty from eleven additional departments, across three colleges, also share an interest in human and natural ecology and participate in the program.

Primary Areas of Faculty Research: Interdisciplinary research activities among faculty participating in the ENDY program are very broad, though particular areas of strength are found in dendrochronology and paleoclimatology; watershed and water resource sciences; geosciences (geomorphology, geodynamics, geodesy, geospatial applications); anthropology; soil sciences; and ecology. In addition, many research activities involve strong components of social sciences and economics. Interested individuals are encouraged to contact the ENDY program or participating faculty to obtain additional information related to specific research projects and possible participation.

Requirements for Admission: Applicants should hold a master's degree in an environmental field such as anthropology, geography, geology, biological sciences, crop, soil, and environmental sciences, or environmental engineering, or in a social science field with an environmental focus (e.g. environmental economics, environmental policy, environmental sociology). Further, these students will be required to have at least a 3.20 GPA in graduate courses. Applicants without the master's degree but with exceptionally strong qualifications may be admitted directly into the ENDY program but must complete the master's requirements. Admission into the program will be by committee evaluation. In addition to fulfilling the requirements for admission to the Graduate School, applicants must also supply the following materials:

1. Three recommendations from individuals familiar with the applicant's academic or work history who can give candid assessments of the applicant's ability to perform at the Ph.D. level.
2. A three-page statement outlining the applicant's plans for an ENDY degree program, relevance of previous academic or work

experience, current research interests or employment that bear on degrees, special skills, fieldwork experience, familiarity with interdisciplinary work (if any), and future career goals.
3. An example of the applicant's writing such as a publication reprint, report, major term paper, undergraduate honors thesis, chapter from M.A./M.S. thesis, or similar document that demonstrates the applicant's organizational skills, research ability, familiarity with a body of literature, ability to report clearly on an academic topic, and/or general writing skills.
4. TOEFL (Test of English as a Foreign Language) and TSE (Test of Spoken English) scores for international students whose native language is not English.
5. GRE scores and other relevant information that would assist the Admissions Committee in selecting applicants to the program.

Requirements for the Degree: During the first semester of study, all students will be assigned an advisory committee to determine the student's particular program of study. Students are required to integrate components of a human dimension into their Ph.D. program. The advisory committee will determine the courses required and assist the student in balancing courses among disciplines.

Students become candidates for the doctorate only upon passing written and oral comprehensive exams. The examination must be passed at least nine months before graduation.

Each candidate must complete a doctoral dissertation on a topic determined through collaboration with a major professor and dissertation committee. This dissertation must be a scholarly and significant original contribution to knowledge within the field of Environmental Dynamics.

A final oral examination is required and must be taken at least two weeks before graduation. The examination will be concerned primarily with the candidate's dissertation but may include other aspects of the graduate work.

Individually tailored programs of study will be designed with the expectation that the student will complete a minimum of 24 hours of course work beyond the master's level, to include three required courses (ENDY 5113 Global Change, ENDY 6013 Environmental Dynamics, and either ENDY/ANTH/GEOL 5053 Quarternary Environments or ENDY/ANTH 6033 Society and Environment). In addition, 18 hours of dissertation research are required.

Environmental Dynamics (ENDY)

ENDY4043 Water Resource Issues (Sp) Human impact on the quantity and quality of water resources including impact of agriculture, industrial, and municipal uses, and a comparative policies and water resource development, past and present. (Same as GEOL 4043)
ENDY5023 Digital Remote Sensing (Sp) Theoretical and applied aspects of the manipulation and interpretation of environmental phenomena recorded by digital remote sensing instruments. Emphasis is on techniques of digital image enhancement and transformation, image geocoding and supervised and unsupervised classification of multispectral image data from Earth-orbiting platforms. Prerequisite: GEOL 4413 or equivalent.
ENDY5033 Advanced Vector Geographic Information Systems (Irregular) Advanced vector operations and analysis. Topics will include topological analysis, network analysis, geocoding, conflation, implications of source and product map scale, map generalization, error mapping, and cartographic production. Prerequisite: (ANTH 4563 or GEOL 4563) or equivalent.
ENDY5043 GIS Analysis and Modeling (Odd years, Sp) Advanced raster topics are examined with a theoretical and methodological review of Tomlin's cartographic modeling principles. Topics vary and include fourier methods, image processing, kriging, spatial statistics, principal components, fuzzy and regression modeling, and multi-criteria decision models. Several raster GIS programs are examined with links to statistical analysis software. Prerequisite: (ANTH 4553 or GEOG 4553) or equivalent.
ENDY5053 Quaternary Environments (Fa) An interdisciplinary study of the Quaternary Period including dating methods, deposits soils, climates, tectonics and human adaptations. (Same as ANTH 5053,GEOG 5053,GEOL 5053)
ENDY5063 Paleoclimatology (Sp) The earth's climate history over the last 2 million years and the influence various factors have had on it; compilation and paleoclimatic histories and methods of dating climatic effects. Prerequisite: GEOG 4363 or equivalent.
ENDY5113 Global Change (Fa) Examines central issues of global change including natural and human induced climate change, air pollution, deforestation, desertification, wetland loss urbanization, and the biodiversity crisis. The U.S. Global Change Research Program is also examined. Prerequisite: graduate standing. (Same as GEOG 5113)
ENDY5153 Environmental Site Assessment (Irregular) Principles, problems, and methods related to conducting an environmental site assessment. An applied course covering field site assessment, regulatory documentation, and report preparation. Prerequisite: GEOL 4033. (Same as GEOL 5153)
ENDY5533 Marine Geology (Sp) Geological principles as applied to the study of the world's ocean basins. Course includes basic theories of ocean basin evolution, continental margin evolution, coastal geologic processes, and methods of study of deep sea records of global change and paleoceanography. Prerequisite: graduate standing. (Same as GEOL 5533)
ENDY5853 Environmental Isotope Geochemistry (SP) Introduction to principles of isotope fractionation and distribution in geological environments isotopic analytical methods, and extraction of isotope samples; application of isotopes in characterization of geologic processes and interaction with hydrologic, surficial, and biologic attenuation, paleothermometry soil and biochemical processes. Prerequisite: GEOL 5063 or GEOL 5263. (Same as GEOS 5853)
ENDY6013 Environmental Dynamics (Irregular) Required course for ENDY doctoral candidates. Overview of Earth Systems: Lithosphere; Hydrosphere, Atmosphere, Biosphere, Cryosphere, and human interaction across Earth systems. Emphasis on understanding of processes within Earth systems and interactions across Earth Systems as they pertain to global self-regulation, secular variation, climate stability, development and sustainability of human societies. Prerequisite: graduate standing.
ENDY6023 Seminar in Environmental Dynamics (Irregular) Seminar examining specific contemporary topic of topics in Environmental Dynamics. Topics will change with each offering. Prerequisite: graduate standing. May be repeated for 6 hours.
ENDY6033 Society and Environment (SP) This course examines the complex interrelationships between human societies and the natural environment. Drawing on diverse and interdisciplinary perspectives in archaeology, ethnography, history, geography, and palaeoenvironmental studies, readings and discussion will explore the co-production of social and environmental systems over time. (Same as ANTH 6033) May be repeated.
ENDY689V Special Problems in Environmental Dynamics (Sp, Su, Fa) (1-6) Independent study of a topic related to environmental dynamics under the guidance of an ENDY faculty member. May be repeated for 6 hours.
ENDY6991 Environmental Dynamics Colloquium (Sp, Fa) Weekly meetings for discussion of current research in environmental dynamics. Graduate students must register for colloquium each semester. Colloquium credit does not count towards minimum hours required for the doctorate. Prerequisite: graduate standing. May be repeated for 6 hours.
ENDY700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing. May be repeated for 18 hours.

ENVIRONMENTAL ENGINEERING (ENEG)

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- Professors Clausen (CHEG), Cross (CHEG), Gross (CVEG), Penney (CHEG), Selvam (CVEG), Thoma (CHEG), Young (CVEG)
- Associate Professors Costello (BENG), Chaubey (BENG), Edwards (CVEG), Matlock (BENG), Nutter (MEEG), Soerens (CVEG)
- Assistant Professor Bajwa (BENG)
- Adjunct Assistant Professor Williams (CVEG)

Degree Conferred:

M.S.En.E (ENEG)

The Master of Science in Environmental Engineering is a multi-discipline degree program designed for students from a multitude of academic areas. Regardless of undergraduate discipline, each candidate for the degree must complete a number of basic undergraduate engineering courses. In general, graduates of engineering programs will have completed most, if not all, of these courses and can expect to be accepted with little or no undergraduate prerequisite requirements. However, the prerequisite requirements for graduates of programs other than engineering can be quite significant.

To more readily accommodate students with diverse academic backgrounds, qualified undergraduate students at the University can apply for acceptance into an integrated undergraduate/graduate program of study after completing 72 credit hours towards the baccalaureate degree. The integrated undergraduate/graduate program allows the student to complete some graduate requirements prior to completion of the baccalaureate degree and receive full admission to the Graduate School. The integrated program consists of four elements: 1) the requirements for the baccalaureate degree sought by the student, 2) a program of general education, mathematics, science, and basic engineering topics, 3) an 18 credit hour series of basic environmental engineering to provide a breadth of knowledge in the general subject matter, and 4) completion of graduate credit in a defined area of environmental engineering specialization. Depending upon the baccalaureate, there can be significant overlap between the requirements of elements 1, 2, and 3. For example, with appropriate course selection, an engineering B.S. degree can fulfill all requirements of elements 1, 2, and 3.

Program Objectives: The objectives of the M.S.En.E. program are to prepare graduates for careers in environmental engineering practice with government agencies, engineering firms, or industries and to provide a foundation for continued study at the post-masters level.

Primary Areas of Faculty Research: Water and wastewater treatment; decentralized collection and treatment systems; soil and groundwater remediation; surface and ground water quality; storm water pollution prevention; environmental and hydrologic modeling; animal waste management; non-point source pollution prevention; watershed management; reactor design and biomass energy; energy systems including heat transfer; thermodynamics and liquid-vapor phase change; bacterial tracers for evaluating movement through fractured subsurface strata.

Application to Integrated Program: Application for acceptance into the integrated undergraduate/graduate program may be submitted either directly to the Coordinator of Environmental Engineering Studies or by referral from the student's undergraduate academic department. Requests for acceptance into the integrated program will be approved only with concurrence from the student's undergraduate academic department. Once accepted, the student must apply for admission to the Graduate School through normal application procedures. The applicant must identify an environmental engineering faculty adviser who will help develop the integrated course of study.

After completing 90 credit hours of study towards the baccalaureate degree, students accepted into the integrated degree program may concurrently enroll in undergraduate and graduate level courses. Such enrollment must be consistent with the integrated course of study developed with the faculty adviser.

Admission Criteria: The following are the minimum criteria for admission to the M.S.En.E. degree program:

GPA: 3.00 or higher
TOEFL: 550 or higher
GRE Scores: No less than 430 Verbal, 650 Quantitative, 520 Analytical.

Degree Requirements: All M.S.En.E. degree candidates, regardless of previous degree status, must demonstrate completion of the Basic Engineering Education and Environmental Engineering Breadth requirements listed below. Candidates who do not possess a degree from a program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) must also satisfy the basic level ABET accreditation requirements. These include completion of no less than 48 credit hours of approved engineering topics and demonstrating, to the satisfaction of the student's graduate study committee, that he/she possesses those abilities and characteristics required of graduates from ABET accredited engineering programs.

This shall include the completion of a course that concentrates on a major design project and that results in the production of a design report or other design product as appropriate. The design project must build on and require engineering knowledge and skills from previous course work and must incorporate engineering standards and realistic constraints. The course selected to satisfy this requirement is subject to the approval of the student's graduate study committee.

Exceptions to these degree requirements may be requested by means of a petition outlining the reasons for the exceptions and presenting an alternate plan for completing the program. The petition shall be subject to the approval of the student's graduate study committee and the Coordinator for the Environmental Engineering Studies. Credit for courses taken at another institution is subject to the approval of the Coordinator of Environmental Engineering Studies. In particular, advanced engineering courses (3000, 4000, and 5000-level at the University of Arkansas) normally will not be accepted for transfer from institutions or degree programs that are not accredited by ABET.

I. Basic Engineering Education Requirements

General Education Recommended Courses	Credit Hours
Humanities/social science Acceptable to undergraduate program	15
English composition ENGL 1013 and 1023	6
Mathematics and Basic Science Recommended Courses	
Calculus & differential equations MATH 2554, MATH 2564, MATH 2574, & MATH 3404	15
Statistics and probability INEG 3313 or STAT 3013	3
General Chemistry CHEM 1123 & 1121L	4
University Physics (calculus based) PHYS 2054 & PHYS 2050L	4
Microbiology BIOL 2013 & BIOL 2011L	4
Organic Chemistry CHEM 3504 or CHEM 3603 and CHEM 3601L	4
Earth Science GEOL 3002 or CSES 2203	2
Basic Engineering Topics Recommended Courses	
Statics MEEG 2003	3
Dynamics MEEG 2013	3
Fluid Mechanics CHEG 2133 or MEEG 3503	3
Engineering Economics CVEG 3022 or INEG 3413	2
Computer Applications CVEG 1113	3

II. Environmental Engineering Breadth Requirements (18 hours)

Required Topics Recommended Courses	
Fundamentals of Environmental Engineering CVEG 3243	3
Reactor Design CHEG 3333	3
Thermodynamics CHEG 3143 or MEEG 2403	3
Applied Hydraulics CVEG 3213, CHEG 3153, or MEEG 4483	3
Elective Topics (6 hours) Recommended Courses	

Chemical Process Safety CHEG 4813	3
Hydrology CVEG 3223	3
Environmental Engineering Design CVEG 4243	3
Occupational Health and Safety INEG 4223	3
Principles of Epidemiology HLSC 5613	3
Environmental Health HLSC 6553	3

Note: The 4000-level and above courses listed above carry graduate credit and may be used in partial fulfillment of the graduate degree requirement provided they have not previously been used for credit toward a B.S. degree and they are approved the student's graduate study committee.

III. Environmental Engineering Specialization (M.S.En.E. graduate program)

Thesis Option: 30 hours of graduate-level course work including 24 hours from one of the following specialty areas plus 6 hours of research resulting in a written Master's Thesis.

Non-Thesis Option: 33 hours of graduate-level course work including 30 hours from one of the following specialty areas plus 3 hours of independent study resulting in a written Master's Report.

Specialty Areas and Approved Courses: Students are expected to select the required hours of graduate courses from one of the two following specialty areas and listing of approved courses. Other courses will be considered on petition to the student's graduate study committee and the Coordinator of Environmental Engineering Studies.

Pollution Prevention and Control Specialty Area:

CHEG 4263 Environmental Experimental Methodology
CHEG 4813 Chemical Process Safety
CHEG 5513 Biochemical Engineering Fundamentals
CVEG 4243 Environmental Engineering Design
CVEG 4263 Environmental Regulations and Permits
CVEG 5234 Water and Wastewater Analysis
CVEG 5243 Groundwater Hydrology
CVEG 5253 Microbiology for Environmental Engineers
CVEG 5283 Solid Waste Management
CVEG 5293 Water Treatment & Distribution System Design
CVEG 5734 Advanced Wastewater Process Design and Analysis
CVEG 5753 or CHEG 5753 Air Pollution
MEEG 4453 Industrial Waste and Energy Management
MEEG 4473 Indoor Environmental Control
MEEG 4483 Thermal Systems Analysis and Design
MEEG 4603 Basic Nuclear Engineering
MEEG 4623 Radiation Protection and Shielding
MEEG 4813 Air Pollution Abatement
MEEG 4843 Environmentally Conscious Design and Manufacturing

Natural and Water Resources Specialty Area:

BENG 4113 Risk Analysis for Biological Systems
BENG 4903 Natural Resources Engineering
BENG 4913 Design of Animal Waste Management Systems
CVEG 4253 Small Community Wastewater Systems
CVEG 4263 Environmental Regulations and Permits
CVEG 5234 Water and Wastewater Analysis
CVEG 5243 Groundwater Hydrology
CVEG 5253 Microbiology for Environmental Engineers
CVEG 5263 Stream Pollution Analysis
CVEG 5283 Solid Waste Management
CVEG 5293 Water Treatment & Distribution System Design
CVEG 5734 Advanced Wastewater Process Design and Analysis
GEOL 4033 Hydrogeology
CSES 5224 Soil Physics

At least 18 of the 30+ credit hours presented for the M.S.En.E. degree credit hours must be 5000-level or higher, and the cumulative grade-point average on all graduate courses presented for the degree must be at least 3.00. The cumulative grade-point average on the basic engineering education and environmental engineering breadth courses must be at least 2.70.

Candidates for the degree must pass a comprehensive final examination that will include either a defense of the candidate's thesis or a presentation and discussion of the candidate's Master's Report. The examination is to be prepared and administered by the student's graduate adviser.

EUROPEAN STUDIES (EUST)

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European Studies (EUST)

EUST470VH Honors Special Topics (Irregular) (1-6) An examination of pertinent issues in Europe. (Same as EUST 470V) May be repeated for 99 hours.
EUST470V Special Topics (Irregular) (1-6) An examination of pertinent issues in Europe. (Same as EUST 470VH) May be repeated for 99 hours.

FINANCE (FINN)

See Graduate School of Business, page 187.

FOOD SCIENCE (FDSC)

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- Distinguished Professor Morris
- University Professors Hettiarachchy, Siebenmorgen
- Professors Buescher, Crandall, Howard, Johnson, Proctor, Ricke, Seideman
- Associate Professors Meullenet, Wang
- Assistant Professor Morawicki
- Adjunct Faculty Foote, King, Li, Marcy, Morris, Owens, Pohlman, Prior, Roberts

Degree Conferred:

M.S., Ph.D. (FDSC)

Primary Areas of Faculty Research: Post-harvest technologies; food engineering; new value-added products and process development; methodology and assessment of quality attributes of raw and processed foods; food biochemistry; food microbiology; food processing and packaging; lipid, protein, and carbohydrate chemistry; enology; food enzymology; functional foods; nutraceuticals; food safety; and sensory analysis.

Prerequisites to Master of Science Degree Program: The student must have a B.S. degree from an accredited institution with a grade-point average of no less than 3.00, a TOEFL score (for international students) of no less than 237 (computer)/580 (paper), no less than 4.5/6 on the TWE score of the TOEFL test, a GRE score (verbal + quantitative) of no less than 1,000 with a minimum of 400 for the verbal, 500 for the quantitative, and 4.0 for the writing test, suitable preparation in food science or related areas, and be acceptable to the department.

Requirements for the Master of Science Degree: A minimum of 24 semester hours of course work and 6 semester hours of thesis are required for the M.S. degree. Course deficiencies, if any, will be identified at the time of acceptance. At least 14 course credits of the 24 credits required must be from 5000-level or higher courses. In addition to coursework, the student will be required to conduct research and prepare an acceptable thesis. Upon admission to this program the candidate will be assigned to a thesis director, who in consultation with the department head will select a graduate committee. This committee will assist with developing a suitable program for the candidate and will serve as the examination committee.

Prerequisites to Doctor of Philosophy Degree Program: Applicants for acceptance into the interdepartmental doctoral program in food science must meet all of the requirements for admission to the Graduate School and the Department of Food Science. Students with a research thesis M.S. degree in Food Science or related sciences from an accredited institution should have an MS GPA of no less than 3.5. Students with a B.S. will be considered for the Ph.D. program if their UGPA is no less than 3.65 and they have had research experience with publishable research results. All applicants to the Ph.D. program (B.S. and M.S.) should have a TOEFL score (for international students) of no less than 237 (computer)/580 (paper), no less than 4.5/6.0 on the TWE score of the TOEFL test, a GRE score (verbal + quantitative) of no less than 1,100 with a minimum of 500 for the verbal, 600 for the quantitative, and 4.0 for the writing test, suitable preparation for the food science graduate program, and be acceptable to the department.

Requirements for the Doctor of Philosophy Degree: Upon acceptance to this program, the student will be assigned to a dissertation director from the department representing the student's selected area of concentration. The dissertation director in consultation with the student and with the department head will select at least two suitable graduate faculty members from outside the student's own department to complete a committee of five members. The doctoral advisory committee chaired by the dissertation director will be responsible for supervision of the student's program development, and will serve as the examination committee for candidacy and final examinations.

The student's course work and dissertation topic will be supervised by the doctoral advisory committee. For students holding an M.S. degree in a science discipline and aside from deficiencies identified upon acceptance to the program, a minimum of 24 semester hours of course credit and a minimum of 18 semester hours of Ph.D. dissertation research credit will be required. Requirements include a minimum of 18 hours of 5000- and 6000-level courses. For students holding a B.S. degree and aside from deficiencies identified upon acceptance to the program, a minimum of 42 semester hours of course credit and a minimum of 18 semester hours of PhD. dissertation research credit will be required. Requirements include a minimum of 30 hours of 5000- and 6000-level courses and up to six hours from the Food Science core courses can be counted toward the 42 hours. The student must maintain a grade-point average of 3.00 or higher. General requirements pertaining to the declaration of intent, admission to candidacy and residency are in accordance with the requirements set forth by the Graduate School of the University of Arkansas.

Food Science (FDSC)

FDSC4114 Food Analysis (Even years, Sp) Methods of analysis, instrumentation, and laboratory techniques for measuring the chemical composition of raw and value-added products. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L. or (CHEM 3603 and CHEM 3601L).

FDSC4124 Food Microbiology (Sp) Microbiology, contamination, preservation, and spoilage of different kinds of foods, food poisoning, sanitation, control, and inspection; microbiology of water; and standard methods for official food and public health laboratories. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2013 and BIOL 2011L and CHEM 1123 and CHEM 1121L. (Same as BIOL 4124)

FDSC4203 Quality Evaluation and Control (Even Years, Fa) Definition of grades and standards of quality by chemical, physical, and sensory techniques. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CHEM 1123 and CHEM 1121L.

FDSC4223 Risk Analysis for Biological Systems (Odd years, Fa) Principles of risk assessment including exposure assessment and dose response, and risk management. Methods of risk analysis modeling and simulation with computer software. Applications of risk analysis in animal, food, and environmental systems. Prerequisite: STAT 2023 (or STAT 2303 or AGST 4023) and BENG 1022. (Same as POSC 4223)

FDSC4304 Food Chemistry (Fa) Water, carbohydrates, lipids, proteins, vitamins, and minerals in foods; biochemical and functional properties, enzymes, food additives (emulsifiers, pigments, colors, flavors, preservatives, and sweeteners) and texture as related to properties in food systems and during processing. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component.Prerequisite: CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC431V Internship in Food Science (Ap, Su, Fa) (1-4) The Food Science Internship is a supervised practical work experience with a food industry, research program or governmental agency to gain professional experience and insight into career opportunities. a maximum of 4 hours credit is allowed for degree credit. Prerequisite: Junior standing and consent. For graduate credit, completion of first year of graduate studies and consent of major professor.

FDSC4413 Sensory Evaluation of Food (Odd years, Fa) Principles and procedures for sensory evaluation of food. Appropriate uses of specific tests are discussed, along with physiological, psychological, and environmental factors affecting sensory verdicts. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: STAT 2303 or WCOB 1033 or AGST 4023 or STAT 2023 or PSYC 2013.

FDSC4713 Food Product and Process Development (Odd years, Sp) Multidisciplinary approaches for developing new food products and processes; in the context of an industry-sponsored project. Group dynamics and interpersonal skills. Factors that influence product and process development. Analysis and modeling applied to food process design. Lecture 2 hours and laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: Junior standing, Food Science majors only or consent.

FDSC4754 Engineering Principles of Food Processing (Odd years, Sp) Basic mechanics of refrigeration, temperature controls, materials handling and mechanical problems as applied to foods and food processing. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: MATH 1213, PHYS 2013, and PHYS 2011L.

FDSC5001 Seminar (Sp, Fa) Presentation and discussion of graduate student research. Prerequisite: graduate standing.

FDSC509V Special Problems Research (Sp, Su, Fa) (1-4) Original investigation on assigned problems in food science. Prerequisite: graduate standing.

FDSC5603 Enology (Even years, Fa) Examination of factors influencing wine grape quality with emphasis on wine and grape regions, grape composition, and fermentation. Lecture/discussion 3 hours per week. Prerequisite: CHEM 3813.

FDSC5703 Fermented Foods (Odd years, Fa) Examination of factors influencing the fermentation of food and beverage, and methods to control the microbiological stability and quality of these products. Lecture/discussion 3 hours per week. Prerequisite: CHEM 3813 and FDSC 4124.

FDSC600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

FDSC602V Special Topics (Irregular) (1-3) Discussions focused on selected topics of particular fields of raw product physiology and food processing. chemistry, physiology, microbiology, evaluation, sensory analysis and preservation. Prerequisite: graduate standing. May be repeated for 99 hours.

FDSC6033 Food Biochemistry (Even years, Sp) Biochemical characteristics, functions, regulation and impact of components in raw and processed foods of plant origin. Lecture/discussion 3 hours per week. Prerequisite: CHEM 3813.

FDSC6123 Food Carbohydrate Chemistry (Odd years, Sp) Focus is on carbohydrate chemistry including molecular structures and physical properties, production and food

applications, analytical methods for food carbohydrates, and interactions among food polysaccharides. Prerequisite: FDSC 4304.

FDSC6133 Food Lipid Chemistry (Even years, FA) Chemistry and technology of commercial fats and oils in food systems with discussion of lipid changes affecting food quality and human health. Prerequisite: FDSC 4304 and FDSC 4114.

FDSC6333 Food Protein Chemistry and Functionality (Odd years, Fa) This course is a study in advanced food protein chemistry, including molecular structures, characterization, physiocochemical bases of food protein functionality, structure-function relationship, processing technologies to improve functionality, as well as hands-on experiences with timely, practical projects related to food proteins. Lecture and problem solving projects for 3 hours per week. Pre- or corequisite: FDSC 4304.

FDSC700V Doctoral Dissertation (Sp, Su, Fa) (1-6) The doctoral program in food science is an interdepartmental program offered by the departments of Food Science, Animal and Poultry Sciences, and Human Environmental Sciences. Prerequisite: graduate standing.

FOREIGN LANGUAGES (FLAN) FRENCH–GERMAN–SPANISH

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- Professors Eichmann, Haydar, Hanlin, Levine, Pritchett, Ricker, Restrepo, Tucker
- Associate Professors Arenberg, Bell, Christiansen, Davis, Fredrick, Jones, Turner
- Research Associate Professor Cornell
- Assistant Professors Bernard, Comfort, Condray, Fukushima, Rozier, Ruiz, Villalobos

Degree Conferred:

M.A. (FREN, GERM, SPAN)

Areas of Concentration: French, German, and Spanish. Supporting courses are offered in Greek and Latin.

Primary Areas of Faculty Research: Please refer to the Department of Foreign Language Web site for detailed information on faculty members and their areas of expertise.

Prerequisites to Degree Program: The student must have a B.A. degree or equivalent from an accredited institution with suitable preparation in the chosen foreign language and be accepted by the department. Deficiencies in undergraduate major or prerequisites for advanced courses may be included in the student's program.

Requirements for the Master of Arts Degree in German and Spanish: Aside from deficiencies, a minimum of 36 semester hours of course work is required for the degree. Each candidate must pass a comprehensive examination covering course work and a reading list. Upon admission to this program the candidate will be assigned an adviser who, in consultation with the candidate, will design a suitable program for the candidate. The adviser, in consultation with other members of the department, will select an examination committee for the comprehensive oral and written examinations. Detailed program descriptions, including reading lists and examination procedures, are available from the department.

Requirements for the Master of Arts Degree in French: Candidates for the Master of Arts Degree in French shall opt for one of two areas of concentration:

Option A: *French Studies Concentration*. Minimum of 36 hours required, 18 of which should be in literature courses approved by the graduate adviser. This option is considered a terminal one for the degree.

Option B: *Literature Concentration*. Candidates for this option must fulfill the 36 hour requirement of Option A and must complete 12 additional hours of literature courses approved by the graduate adviser, 6 of which must be 600V for presentation of a master's thesis. Candidates holding teaching assistantships may have their assistantships renewed for a third year.

Any course substitutions must be approved by the French graduate adviser.

Foreign Languages (FLAN)

FLAN4003 Special Language I (Fa) Under the number, various oriental, African, or other less commonly-taught languages will be offered from year to year. Prerequisite: junior standing. May be repeated for 3 hours.

FLAN4013 Special Languages II (Sp) Continuation of Special Language I. Prerequisite: FLAN 4003 or equivalent. May be repeated for 3 hours.

FLAN4023 Language Teaching and the Internet (Fa) This course provides senior level undergraduate and graduate students of foreign languages with innovative ways to teach and communicate through the use of the internet as applied to second language learning. Topics of discussion include instructional systems design, web-based technologies, graphics, presentation technologies, and effective utilization of technological tools in language courses. Prerequisite: Senior standing.

FLAN4033 Language Teaching and Video Applications (Sp) This course profices senior lever undergraduates and graduate students with the knowledge and skills needed to teach and communicate through the use of video as applied to second languages. Topics of discussion include instructional systems design, vidoe taping, editing and development for internet and DVD delivery,a nd effective utilization of video in teaching and communication. Prerequisite: Senior standing. May be repeated.

FLAN4713 Language and Culture (Sp, Su, Fa) Anthropological approaches to the description and analysis of languages and their extension into ethnographic semantics with emphasis on cognitive models and their sociological correlates. (Same as ANTH 4713,COMM 4713)

FLAN504V Translation Workshop (Irregular) (1-6) Problems of translation and the role of the translator as both scholar and creative writer; involves primarily the discussion in workshop of the translations of poetry, drama, and fiction done by the students, some emphasis upon comparative studies of existing translations of well-known works. Primary material will vary. Prerequisite: reading knowledge of a foreign language.

FLAN505V Workshop (Irregular) (1-3) Specialized professional problems and topics in foreign language based career areas. May be repeated for 3 hours.

FLAN5063 Teaching Foreign Languages on the College Level (Irregular) Focus on basic methodological concepts and their practical application to college foreign language instruction.

FLAN5083 Developments in Second Language Teaching (Irregular) A review of techniques, strategies, and methodologies and a survey of recent developments in second language teaching.

FLAN575V Special Investigations (Sp, Fa) (1-6) May be repeated for 6 hours.

Arabic (ARAB)

ARAB4053 Arabic Readings (Sp, Su, Fa) Develops skill in description, analysis, and argumentation through weekly reading and writing assignments within a workshop atmosphere. Selected readings from various styles of standard Arabic, ranging from newspapers to literary texts.

ARAB470V Special Topics (Sp, Su, Fa) (1-6) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for 99 hours.

ARAB575V Special Investigations (Sp, Su, Fa) (1-3) May be repeated for 99 hours.

Middle Eastern Studies (MEST)

MEST4003H Honors Middle East Studies Honors Colloquium (Sp, Su, Fa) (Same as MEST 4003) May be repeated for 3 hours.
MEST4003 Middle East Studies Colloquium (Sp, Su, Fa) An interdepartmental colloquium with an annual change in subject required of all students in the Middle East studies program. Prerequisite: sophomore standing. (Same as MEST 4003H) May be repeated for 6 hours.

French (FREN)

FREN4003 French Grammar and Composition (Fa) Prerequisite: FREN 3003 or FREN 3103. (Same as FREN 4003I)
FREN4033 French for Oral Proficiency (Sp) Three hours per week of conversation practice for the advanced undergraduate. Prerequisite: FREN 3003 or FREN 3103.
FREN4063 Applied Linguistics: Phonology, Morphology, and Syntax (Fa) Prerequisite: FREN 3003 and FREN 3103.
FREN4113 Special Themes in French Literature (Irregular) Topics not normally covered in period courses. Sample topics: "The Comic Tradition in French Literature," "French Cinema." Topics announced one semester in advance. Prerequisite: FREN 3113.
FREN4203H Honors Quebec Studies (Irregular) A study of Quebec's culture, institutions, economy, literature and cinema. Prerequisite: FREN 3113. (Same as FREN 4203)
FREN4203 Quebec Studies (Irregular) A study of Quebec's culture, institutions, economy, literature and cinema. Prerequisite: FREN 3113. (Same as FREN 4203H)
FREN4213 French Civilization (Sp) Prerequisite: FREN 3113. (Same as FREN 4213I)
FREN4223 A Survey of French Literature I (Sp, Su, Fa) A survey of French literature, its forms and themes from the medieval period through the 18th century. Prerequisite: FREN 3113.
FREN4233 A Survey of French Literature II (Sp, Su, Fa) A survey of French literature, its forms and themes in the 19th and 20th centuries. Prerequisite: FREN 3113.
FREN4333 Business French (Fa) Introduction and orientation to the French world of business and commerce through the study of vocabulary, forms, and formulas and expression used in commercial correspondence. Prerequisite: FREN 3113.
FREN4343 Business French: Quebec (Sp) Introduction to French Business Language in the context of North America, focusing on Quebec and its economy. Prerequisite: FREN 3113 May be repeated for 6 hours.
FREN5003 French Grammar and Phonetics (Irregular) Systematic review of principles of French grammar and syntax; Comprehensive presentation of French phonetics.
FREN5013 French Stylistics and Advanced Composition (Irregular) Analysis of genres and stylistic choices available in written French. Intensive practice in composition especially as it relates to graduate-level courses.
FREN5033 Advanced French Conversation (Irregular) This course will provide small discussion environment in which graduate students will improve their command of spoken French in an interactive setting. Discussion will concentrate on current cultural issues in the French speaking world.
FREN5213 French Culture & Civilization (Irregular) An analysis of French cultural symbols and attitudes as observed in their historical economical, political, social, educational, and linguistic aspects.
FREN5233 Advanced Business French (Irregular) The purpose of this course is to provide insight into both the language and the culture of the French-speaking business world, primarily in metropolitan France. The course is primarily an advanced language course focused on a specialized and technical vocabulary and subject matter, drawn from the world of business.
FREN5333 Old French Literature (Irregular) An intensive study of French Medieval Literature from the Chansons de Geste to Vilon, including an in-depth analysis of the genres and their evolution, and of the major authors of the times.
FREN5433 French 16th Century Literature (Irregular) A survey of representative writers of the sixteenth century.
FREN5533 French 17th Century Theatre (Irregular)
FREN5543 French 17th Century Literature (Irregular) A survey of representative writers of the seventeenth century.
FREN5673 French 18th Century Literature (Irregular)
FREN5703 Special Topics (Irregular) May be offered in a subject not specifically covered by the courses otherwise listed. May be repeated for 6 hours.
FREN5723 The Development of French Romanticism (Irregular)
FREN575V Special Investigations (Irregular) (1-6) May be repeated for 99 hours.
FREN5783 The French Nineteenth Century Novel (Irregular)
FREN5813 French 20th Century Theatre (Irregular)
FREN5823 French 20th Century Literature (Irregular) A survey of representative writers of the twentieth century.
FREN5833 French 20th Century Novel (Irregular)
FREN600V Master's Thesis (Irregular) (1-6)

German (GERM)

GERM4033 Conversation (Sp) Three hours per week of conversation practice for the advanced undergraduate. Prerequisite: GERM 2013.
GERM4123 The German Novelle (Irregular) An intensive study of the novelle as a genre from its origin to the present. Prerequisite: GERM 3013.
GERM4133 The German Drama (Irregular) A study of the development of the forms and themes of the German drama from the middle ages to the present. Prerequisite: GERM 3013.
GERM4143 German Lyric Poetry (Irregular) A study of the forms and themes of German lyric poetry from the middle ages to the present. Prerequisite: GERM 3013.
GERM4213 German Civilization (Irregular) Prerequisite: GERM 2013 or equivalent. (Same as GERM 4213I)
GERM4223 German-Speaking Countries in the 20th Century (Sp, Su, Fa) Continues the introduction to German culture and civilization begun with GERM 4213 with emphasis on the emergence in the 20th century contemporary Austria, Switzerland, and a unified Germany.
GERM4343 Business German II (Sp) Introduces students to the language of business German and provides insights into business practices in the German-speaking countries. Covers aspects of business geography, environmental issues, merchandizing, trade, forms of payment, taxation, benefits, import/export, and business correspondence. Open to all majors; no business prerequisites. Prerequisite: GERM 2013 and GERM 4333. May be repeated for 6 hours.
GERM470V Special Topics (Irregular) (1-3) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for 6 hours.
GERM5223 Early German Literature: Middle Ages to the Enlightenment (Sp, Su, Fa)
GERM5273 German Literature: Enlightenment, Storm and Stress, and Classicism (Sp, Su, Fa)
GERM5323 German Literature: Romanticism and Realism (Sp, Su, Fa)
GERM5343 Early Modern German Literature: Late 19th and Early 20th Century (Sp, Su, Fa)
GERM5363 German Literature after 1945 (Sp, Su, Fa)
GERM5703 Special Topics (Sp, Su, Fa) May be offered in a subject not specifically covered by the courses otherwise listed. May be repeated for 6 hours.
GERM575V Special Investigations (Sp, Su, Fa) (1-6) May be repeated for 99 hours.
GERM600V Master's Thesis (Sp, Su, Fa) (1-6)

Greek (GREK)

GREK4023 Greek Poetry or Plato (Irregular) Selections from the Elegiac, Iambic, and Lyric poets. Plato's Apology and Crito. Prerequisite: GREK 2013 or equivalent.
GREK4033 Herodotus or Thucydides (Irregular) Readings of Herodotus, Book VII, and Thucydides, Book VI; collateral readings on the Persian and Peloponnesian Wars. Prerequisite: GREK 2013 or equivalent.
GREK4043 Greek Drama (Irregular) Readings of 2 tragedies and one comedy; a study of the Greek theatre. Prerequisite: GREK 2013 or equivalent.
GREK475V Special Investigations (Sp, Su, Fa) (1-6) May be repeated for 99 hours.
GREK575V Special Investigations (Irregular) (1-6) May be repeated for 12 hours.

Japanese (JAPN)

JAPN4313 Language and Society of Japan (Fa) The primary objective of this course is to investigate the way the Japanese language reflects the beliefs and custom of the Japanese people as a social group. For comparison purposes, this course makes reference to studies in American language and culture. Proficiency in Japanese not required. Prerequisite: junior standing.
JAPN4333 Business Writing in Japanese (Sp) This course aims to familiarize the students with formats, vocabulary, and situationally specific expressions in Japanese business correspondence. Prerequisite: JAPN 2013 or equivalent Japanese proficiency.

Latin American Studies (LAST)

LAST4173 The Latin American City (Irregular) This course examines the social, political, and cultural aspects of the modern Latin American city from an interdisciplinary perspective. The course includes an introduction to urban studies concepts, and each semester is organized around a specific set of case studies. May be repeated for 99 hours.

Latin (LATN)

LATN4003 Roman History (Irregular) Selections from Sallust, Livy, Tacitus, or Suetonius. An overview of Roman Historiography through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent.
LATN4013 Roman Satire (Irregular) Selections from the satires of Horace, Juvenal, Persius, or Seneca. An overview of Roman humor and the genre of satire through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent.
LATN4023 Roman Didactic Epic (Irregular) Selections from Virgil's Georgics, Lucretius' De Retum Natura, or Manilius' Astronomica. An overview of Roman philosophical poetry through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent.
LATN4033 Roman Drama (Irregular) Selections from Plautus, Terence, or Seneca. An overview of Roman theater through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent.
LATN4043 Roman Elegy (Irregular) Selections from Propertius, Tibullus, or Ovid. An overview of the genre through the critical study of complete works in translation and second-

ary works. Prerequisite: LATN 3013 or equivalent.
LATN4063 Roman Pastoral and Lyric (Irregular) Selections from Catullus, Virgil's Eclogues, Horace's Odes, or Calpurnius Siculus. An overview of the two genres through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent. May be repeated for 6 hours.
LATN4073 Roman Novel (Irregular) Selections from Petronius or Apuleius. An overview of the genre through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent.
LATN4083 Roman Oratory (Irregular) Selections from the orations and theoretical works of Cicero, Seneca the Elder, or Quintilian. An overview of the genre through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent. May be repeated for 6 hours.
LATN4093 Roman Philosophy (Irregular) Selections from the philosophical works of Cicero or Seneca. An overview of Roman philosophy through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent. May be repeated for 6 hours.
LATN4153 Roman Narrative Epic (Irregular) Selections from Virgil, Ovid, Lucan, Statius, or Silius Italicus. An overview of the genre through the critical study of complete works in translation and secondary works. Prerequisite: LATN 3013 or equivalent. May be repeated for 6 hours.
LATN5633 Medieval Latin (Irregular) Selections from medieval writers from the 4th to the 17th century. Prerequisite: LATN 3003 or equivalent.
LATN575V Special Investigations (Irregular) (1-6) May be repeated for 99 hours.

Russian (RUSS)

RUSS4003 Advanced Russian I (Irregular) Advanced Russian reading, conversation, and composition. Review of grammar and syntax. Prerequisite: RUSS 3013.
RUSS4013 Advanced Russian II (Irregular) Advanced Russian reading, conversation, and composition. Review of grammar and syntax. Prerequisite: RUSS 4003.
RUSS4123 Survey of Russian Literature from Its Beginning to the 1917 Revolution (Fa) The instructor will discuss the historical and cultural backgrounds while focusing on major writers and will deal with literature as an outlet for social criticism. There will be textual analysis. It will be taught in English. (Same as WLIT 4123)
RUSS4133 Survey of Russian Literature Since the 1917 Revolution (Odd Years, Sp, Fa) The instructor will discuss the historical and cultural backgrounds while focusing on major writers and will deal with literature as an outlet for social criticism. There will be textual analysis. It will be taught in English with readings in English. (Same as WLIT 4133)
RUSS470V Special Topics (Irregular) (1-6) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for 6 hours.
RUSS575V Special Investigations (Even Years, Sp, Fa) (1-3) May be repeated for 99 hours.

Russian Studies (RSST)

RSST4003H Honors Russian Studies Colloquium (Sp) (Same as RSST 4003) May be repeated for 3 hours.
RSST4003 Russian Studies Colloquium (Sp) An interdepartmental colloquium with an annual change in subject of investigation, required of all students in the Russian Studies program. Prerequisite: sophomore standing for Russian studies majors and honors students. (Same as RSST 4003H) May be repeated for 6 hours.

Spanish (SPAN)

SPAN4003 Advanced Grammar (Sp) For majors and advanced students covering the problematic areas of Spanish syntax and usage. Prerequisite: SPAN 3003 and SPAN 3103. (Same as SPAN 4003I)
SPAN4033 Advanced Conversation (Sp) Three hours per week of conversation practice for the advanced undergraduates. Prerequisite: SPAN 3033 and SPAN 4003.
SPAN4063 Spanish Linguistics (Irregular) This course will cover various topics in the field of Spanish linguistics, including phonetics and phonolgy. Prerequisite: SPAN 3003.
SPAN4103 Monuments of Spanish Literature (Fa) Survey of the major works of Spanish literature from El Cid through the 20th century. Prerequisite: SPAN 3113.
SPAN4133 Survey of Spanish-American Literature (Sp) Monuments of Spanish-American literature from the Colonial period to the present, with a concentration on the period from 1888 to the present. Prerequisite: SPAN 3113.
SPAN4213 Spanish Civilization (Sp) A wide-ranging exploration of Spanish history and culture from the Middle Ages to the present. Prerequisite: SPAN 3113.
SPAN4223 Latin American Civilization (Fa) Prerequisite: SPAN 3113. (Same as SPAN 4223I)
SPAN4233 Modern Mexico: Culture & Society (Sp, Su, Fa) A wide-ranging exploration of culture and society in Mexico today, its unity and diversity, as tradition confronts the processes of modernization and globalization. Includes an historical survey, but focuses on contemporary issues, such as relations with U.S. This course will be taught in Spanish. Prerequisite: SPAN 3113.
SPAN4243 Literature and Culture in the Hispanic United States (Sp, Su, Fa) An exploration of the history and culture, art and politics of the major Hispanic groups in the United States. Focus on contemporary attitudes and issues. Prerequisite: SPAN 3113.
SPAN4253 Latin American Cinema and Society (Irregular) This course examines key issues in Latin American culture and history through films, documentaries, and literary and cultural texts. Topics included are: Human Rights, Ethnicity, Gender, Revisions of the past. Prerequisite: SPAN 3113.
SPAN4333 Business Spanish I (Sp) Enhances ability to relate to Spanish-speaking business environments by providing a solid foundation in vocabulary and discourse related to functional business areas such as organization of a company structure, management, banking and accounting, capital investment, personnel and office systems, production of goods and services, marketing, finance, and import-export. Prerequisite: SPAN 3003.
SPAN4433 Business Spanish II (Sp) Reinforces concepts and vocabulary covered in SPAN 4333 and further enhances ability to function in a Spanish-speaking environment by providing instruction in the preparation of written documents such as form letters, communiques, letters of credit, contracts, memoranda, letters of recommendation, dossiers, and order forms. Prerequisite: SPAN 4333.
SPAN470V Special Topics (Irregular) (1-3) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for 6 hours.
SPAN5003 Workshop in Advanced Intensive Spanish (Irregular) Improvement of language proficiency in areas of listening and speaking. Includes a review of grammar, phonetics, and vocabulary (with cultural enrichment) as needed, with stress on oral practice and presentation. Prerequisite: adequate functional use of the language.
SPAN5013 Advanced Stylistics and Composition (Irregular) Systematic review of principles of Spanish grammar and syntax and the development of writing skills. Focus on methods of teaching Spanish grammar.
SPAN5203 Medieval Spanish Literature (Irregular) From the 'Jarchas' to the Celestina.
SPAN5233 Golden Age Novel (Irregular) Major works of Spanish prose fiction from the 16th and 17th centuries, with close reading of major works.
SPAN5243 Golden Age Poetry and Drama (Irregular) History and development of those genres in the 16th and 17th centuries, with close reading of major works.
SPAN5253 Colonial Literature and Culture (Sp, Su, Fa) An introductory course to the history, culture and literature of colonial Spanish America from 1492 until 1810. The course will cover representative colonial and indigenous texts and their contexts including Renaissance, Baroque, and travel literature of the Eighteenth Century. The course will be taught in Spanish.
SPAN5273 Nineteenth Century Survey (Irregular) From Neoclassicism through Naturalism.
SPAN5283 Nineteenth Century Drama and Poetry (Irregular) From Romanticism to the Generation of 1898.
SPAN5343 Advanced Survey of Spanish Literature Since 1898 (Irregular) intensive survey of the literature of Spain from the Generation of 1898 to the present. Prerequisite: graduate standing.
SPAN5363 Spanish American Literature (1492-1900) (Irregular) Representative of works of Spanish American prose and poetry, including selections from indigenous literatures, the crınicast, and colonial literature up to the movement of modemismo.
SPAN5383 Twentieth Century Spanish American Poetry (Irregular) From the development of modernism to the present day.
SPAN5393 19th Century Spanish American Literature (Sp, Su, Fa) Study of representative literary works from Independence (1810) to 1900's. The course covers Neoclassicism, Romanticism, Realism/Naturalism, and Modernism and the role of literature in the nation-building process. The course will be taught in Spanish.
SPAN5403 Spanish American Theatre (Sp, Su, Fa) Historical examination of the theatre in Spanish America, with close analysis particularly of representative works and movements in the 20th century.
SPAN5433 Cervantes: Don Quijote (Irregular) A close reading of Spain's greatest literary masterpiece.
SPAN5453 Cinema and Literature (Irregular) This course examines several Latin American and Spanish texts and their film adaptations as well as the main film making trends in the Hispanic world.
SPAN5463 20th Century Spanish American Literature (Sp, Su, Fa) Critical survey of major movements and outstanding and representative works in 20th century prose and poetry, from the Mexican Revolution and the avant-garde to the contemporary boom and post-boom.
SPAN5533 Mexican Literature (Sp, Su, Fa) An exploration of the special features and particular qualities if Mexican literature, as one of the most representative and complex of the Latin American national literatures. Includes an historical survey, but each class will focus on selected topics and issues especially in modern Mexican literature and culture.
SPAN5603 History of the Spanish Language (Irregular) Spanish from its origins to the present; relations between Spanish and the other romance languages.
SPAN5703 Special Topics (Irregular) May be offered in a subject not specifically covered by the courses otherwise listed. May be repeated for 6 hours.
SPAN575V Special Investigations (Irregular) (1-6) May be repeated for 99 hours.
SPAN5803 Seminar (Irregular) Seminar subjects vary from year to year. Available subjects, given as needed, include the Old Spanish Language, Poema de mfo Cid. Golden Age Poetry, the Celestina, 20th century Spanish drama, and the romances. May be repeated for 6 hours.
SPAN600V Master's Thesis (Irregular) (1-6)

FRENCH

See Foreign Languages, page 107.

GENERAL AGRICULTURE (GNAG)

See Agricultural, Food, and Life Sciences, page 51.

GEOSCIENCES, DEPARTMENT OF (GEOS)

Pamela E. Jansma

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Geography Faculty:
- Distinguished Professor Stahle
- Adjunct University Professor Limp
- Professors Dixon, Hehr, Paradise
- Associate Professors Davidson, Graff
- Assistant Professors Cothren, Tullis

Geology Faculty:
- Professors Brahana, Guccione, Jansma, Konig, Manger, Mattioli, Steele, Zachry
- Associate Professors Boss, Davis
- Adjunct Associate Professor Hays
- Research Assistant Professor Nelson

Degrees Conferred:

M.A. in Geography (GEOG)
M.S. in Geology (GEOL)

Geography (GEOG)

Areas of Concentration: Human geography, physical geography, GIS, cartography, space and planetary sciences.

Prerequisites to Degree Program: Applicants must be admitted to the Graduate School and meet the following requirements: 1) satisfactory undergraduate preparation in geography, 2) three letters from persons competent to judge applicant's potential for graduate studies, and 3) a completed departmental application. Students who do not meet these requirements may be admitted conditionally. Students with course deficiencies may enroll concurrently in graduate courses.

Requirements for the Master of Arts Degree: A student may choose one of three options to satisfy the requirements for a Master of Arts degree in Geography:

Geography M.A. with Thesis: A minimum of 24 semester hours of course work including core courses specified by the department, six semester hours of thesis, and an oral examination conducted by the candidate's faculty committee.

Geography M.A. with Internship: A minimum of 30 semester hours of course work including core courses specified by the department, six hours of internship, evidence of research ability, and an oral examination conducted by the candidate's faculty committee.

Geology (GEOL)

Areas of concentration: General geology, space and planetary sciences

Instruction in geology at the graduate level focuses on preparation of students to become practicing professional geologists in industry or to pursue, without deficiencies, doctorates at established programs. Students intending to enter the industrial workforce are encouraged to maintain a broad perspective with an emphasis in an area of geology that has a demonstrated record of past employment, such as petroleum geology or environmental geology. The greatest strength of the program in geology at the University of Arkansas is instruction in practical geologic interpretation, with emphasis on field relationships. This instructional strength includes all levels of teaching and supports an active research program that serves to strengthen the research and communication skills of the students through writing assignments, oral presentations, and participation in professional societies.

Prerequisites to Degree Program: Students admitted to graduate study should have completed an undergraduate geology program similar to that required for the B.S. degree at the University of Arkansas. Applicants lacking an appropriate background may satisfy deficiencies while enrolled in Graduate School. Prospective students should submit application forms, three letters of recommendation, and a statement of their graduate and professional goals before March 15 for the fall semester and October 15 for the spring semester to assure their consideration. These dates are also deadlines for receipt of application for financial assistance.

Requirements for the Master of Science Degree: The program in Geology requires 30 graduate course credit hours, six of which will be derived from a thesis reporting the results of an original laboratory or field research problem. All course work, a thesis topic, and the final thesis must be approved by the student's thesis committee. This committee is selected by the student and the student's thesis director and will consist of a minimum of three members. At least two of the committee members will be chosen from geology faculty whose areas of expertise coincide with the research interests of the student.

Each student will complete a core curriculum consisting of a minimum of 12 hours selected from the following courses: GEOL 4053 Geomorphology; GEOL 4433 Geophysics; GEOL 5063 Geochemistry or GEOL 5263 Hydrochemical Methods; GEOL 5123 Stratigraphic Principles and Practice; GEOL 5223 Sedimentary Petrology. Each student must complete a minimum of 18 credit hours in geology courses, including one credit hour of GEOL 5001 Graduate Seminar, in addition to the six credit hours for the thesis.

Students who have completed some or all of these core courses as part of their undergraduate program must substitute additional elective courses, as approved by their thesis committee, to fulfill the minimum required 24 credit hours of course work.

To complete the requirements for the degree, the candidate must complete all course work with a grade-point average of 3.00, submit an acceptable thesis, and pass a comprehensive examination based primarily on a defense of the student's thesis.

Geography (GEOG)

GEOG4013 Latin America (Irregular) Geography of South America, Mexico, Central America, and the Caribbean Islands.

GEOG4033 Geography of the Middle East (Irregular) Physical and cultural landscapes, natural and cultural resources, art and architecture, landuse, political history, OPEC, and current problems of North Africa and the Middle East region west of Afghanistan are discussed. Class participation, discussions, slides and films, and student presentations will round out the class. Prerequisite: junior standing.

GEOG4063 Urban Geography (Sp) Areal patterns of modern urban regions and the focus shaping these patterns. Emphasis is placed on American urban areas and their evolution and functional areas. Field work. Prerequisite: junior standing.

GEOG4173 The Latin American City (Irregular) This course examines the social, political, and cultural aspects of the modern Latin American city from an interdisciplinary perspective. The course includes an introduction to urban studies concepts, and each semester is organized around a specific set of case studies.

GEOG4243 Political Geography (Odd years, Fa) Contemporary world political problems in their geographic context. Development of the principles of political geography with emphasis upon the problems of Eastern Europe, Africa, and Southeast Asia. Prerequisite:

junior standing.

GEOG430V Internship in Physical Geography (Sp, Su, Fa) (3-6) Supervised experience in municipal, county, state or private natural resource management agency, or any other such organization approved by instructor.

GEOG4353 Elements of Weather (Fa) Examination of the atmospheric processes that result in multifarious weather systems. Offered as physical science. Prerequisite: junior standing.

GEOG4363 Climatology (Sp) Fundamentals of topical climatology followed by a study of regional climatology. Offered as physical science. Prerequisite: GEOG 1003 and/or GEOG 4353.

GEOG4384 Principles of Landscape Evolution (Fa) Examines the role of waves, rivers, wind, and tectonics in shaping and modifying the surface of the earth. Considers the way in which an understanding of landscape processes is essential to the effective solution of environmental problems. Lecture 3 hours, laboratory 2 hours per week. May be repeated for 3 hours.

GEOG440V Internship in GIS & Cartography (Sp, Su, Fa) (3-6) Supervised experience in GIS and/or cartographic applications with municipal, county, state, or private enterprises. May be repeated for 6 hours.

GEOG4523 Computer Mapping (Sp) This course addresses advanced cartographic concepts (i.e. visual hierarchy, aesthetics, image cognition) and production techniques as they relate to computer-assisted mapping. Students produce a variety of maps using AutoCad and FreeHand software to build a map portfolio. Field trips may be required. Prerequisite: GEOG 3023.

GEOG4543 Geographic Information Science (FA, SP) Computer assisted analysis and display of geographic resource data. Course develops the theory behind spatial data analysis techniques, and reinforces the theory with exercises that demonstrate its practical applications. (Same as ANTH 4543)

GEOG4553 Introduction to Raster GIS (Fa) Theory, data structure, algorithms, and techniques behind raster-based geographical information systems. Through laboratory exercises and lectures multidisciplinary applications are examined in database creation, remotely sensed data handling, elevation models, and resource models using boolean, map algrebra, and other methods. Prerequisite: GEOG 4543 or ANTH 4543. (Same as ANTH 4553)

GEOG4563 Vector GIS (Sp, Su, Fa) Introduction to geographic information systems (GIS) applications in marketing, transportation, real estate, demographics, urban and regional planning, and related areas. Lectures focus on development of principles, paralleled by workstation-based laboratory exercises using Arc-node based software and relational data bases. Prerequisite: GEOG 3023 or GEOG 4543. (Same as ANTH 4563)

GEOG4573 Introduction to GRASS Applications in GIS (Irregular) An introduction to geographic information systems (GIS) problem solving using the Geographic Resource Analysis Support System (GRASS) software. (Same as ANTH 4573)

GEOG4593 Introduction to Global Positioning Systems (Sp, Su, Fa) Introduction to navigation, georeferencing, and digital data collection using GPS receivers, data loggers, and laser technology for natural science and resource management. Components of NavStar Global Positioning system are used in integration of digital information into various GIS platforms with emphasis on practical applications. (Same as ANTH 4593)

GEOG4653 Advanced Raster GIS (Odd years, Sp) Advanced raster topics are examined beginning with a theoretical and methodological review of Tomlin's cartographic modeling principles. Topics vary and include Fourier methods, image processing, kriging, spatial statistics, principal components, fuzzy and regression modeling, and multi-criteria decision models. Several raster GIS programs are examined with links to statistical analysis software. Prerequisite: GEOG 4553 or ANTH 4553.

GEOG4723 Australia and the Pacific Islands (Irregular) Natural setting, resources, and human use of these areas and the significance of their world position. Prerequisite: junior standing.

GEOG4753 Geography of the United States and Canada (Irregular) The geographic regions of Anglo-America. Prerequisite: junior standing. (Same as GEOG 4753I)

GEOG4783 Geography of Europe (Irregular) Geographic regions of the area with emphasis on their present development. Prerequisite: junior standing.

GEOG4793 Geographic Concepts for Global Studies (Su) Application of geographic concepts and perspectives for analyzing global relationships. Developing and developed nations as well as geographic themes of current importance will be examined. Prerequisite: junior standing.

GEOG4863 Quantitave Techniques in Geosciences (SP, Odd Years) An introduction to the application of standard quantitative and spatial statistical techniques to geoscientific analysis. Students will use both micro and large system computers in the course. Prerequisite: (STAT 4003 and STAT 4001L) or equivalent. (Same as ANTH 4863)

GEOG5003 Seminar in Geography (Irregular) Selected topics, the nature of which varies with the need. Prerequisite: graduate standing. May be repeated for 3 hours.

GEOG5011 Colloquium (Sp) Weekly meetings of faculty, graduates, advanced students and guests to discuss research and trends in the field of geography. May be repeated for 2 hours.

GEOG5053 Quaternary Environments (Fa) An interdisciplinary study of the Quaternary Period, including dating methods, deposits, soils, climates, tectonics, and human adaptation. Lecture 2 hours, laboratory 2 hours per week. Prerequisite: graduate standing. (Same as ANTH 5053,GEOL 5053)

GEOG5093 History of Geography (Even years, Sp) Chronological development of the science; leaders in the field of geography; and the evolution of the major concepts of geography. Prerequisite: graduate standing.

GEOG510V Special Problems in Physical Geography (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

GEOG5113 Global Change (Fa) Examines central issues of global change including natural and human induced climate change, air pollution, deforestation, desertification, wetland loss urbanization, and the biodiversity crisis. The U.S. Global Change Research Program is also examined.

GEOG520V Special Problems in Human Geography (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

GEOG530V Special Problems in Regional Geography (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

GEOG5313 Planetary Atmospheres (Irregular) Origins of planetary atmospheres, structures of atmospheres, climate evolution, dynamics of atmospheres, levels in the atmosphere, the upper atmosphere, escape of atmospheres, comparative planetology of atmospheres.

GEOG5333 Research Methods and Materials in Geography (Odd years, Fa) Geographical research and the preparation of research papers. Prerequisite: graduate standing.

GEOG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

Geology (GEOL)

GEOL4033 Hydrogeology (Sp) Occurrence, movement, and interaction of water with geologic and cultural features. Lecture 3 hours per week. Corequisite: Lab component. Prerequisite: MATH 2564 and GEOL 3513 and GEOL 3511L.

GEOL4043 Water Resource Issues (Fa) Human impact on the quantity and quality of water resources including impact of agriculture, industrial, and municipal uses, and a comparative policies and water resource development, past and present.

GEOL4053 Geomorphology (Sp) Mechanics of landform development. Lecture 2 hours, laboratory 3 hours per week. Several local field trips are required during the semester. Corequisite: Lab component. Prerequisite: GEOL 1113 or GEOL 3002.

GEOL4153 Karst Hydrogeology (Irregular) Assessment of ground water resources in carbonate rock terrains; relation of ground water and surface water hydrology to karst; quantification of extreme variability in karst environments; data collection rationale. Field trips required. Prerequisite: GEOL 4033.

GEOL4223 Stratigraphy and Sedimentation (Sp) Introductory investigation of stratigraphic and sedimentologic factors important to the study of sedimentary rocks. Lecture 2 hours, laboratory 3 hours per week. A required weekend, two-day field trip will be conducted during the semester. Corequisite: Lab component.Prerequisite: GEOL 3413.

GEOL4253 Petroleum Geology (Fa) Distribution and origin of petroleum. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: geology major and senior standing. May be repeated for 3 hours.

GEOL436V Geology Field Trip (Sp) (1-2) Camping field trip to areas of geologic interest, usually conducted during Spring Break. Prerequisite: GEOL 3313. May be repeated for 4 hours.

GEOL4413 Principles of Remote Sensing (Fa) Theoretical and practical consideration of radar imagery, aerial photography, and infrared imagery for understanding Earth resource problems related to agriculture, archeology, engineering, forestry, geography, and geology. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: GEOL 1004 and GEOL 1113 or GEOL 3002. (Same as GEOS 4413)

GEOL4433 Geophysics (Irregular) Derivation from physical principles, of the geophysical methods for mapping the Earth. Computational methods of converting gravity, magnetic, radiometric, electrical, and seismic data into geologic information. Lecture 3 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: MATH 2564 and PHYS 2033 and PHYS 2031L and GEOL 3513 and GEOL 3511L.

GEOL5001 Graduate Seminar (Irregular) Informal discussions of research as reported in geological literature. All graduate students are expected to attend.

GEOL5053 Quarternary Environments (Fa) An interdisciplinary study of the Quarternary Period, including dating methods, deposits, soils, climates, tectonics, and human adaptation. Lecture 2 hours, laboratory 2 hours per week. Prerequisite: graduate standing. (Same as ANTH 5053,GEOG 5053)

GEOL5063 Geochemistry (Fa) Chemistry of geologic processes and the geochemical cycles of selected elements. Prerequisite: CHEM 1103 and CHEM 1101L and CHEM 1123 and CHEM 1121L.

GEOL5076 Advanced Field Methods of Applied Hydrogeology (Su) Applied field course emphasizing collection and interpretation of ground water data. Three hours may be applied toward an M.S. degree in geology. Prerequisite: GEOL 4033.

GEOL5123 Stratigraphic Principles and Practice (Irregular) Physical and biological characteristics of sedimentary environments and their correlation in time with emphasis on the local geologic section. Corequisite: Lab component. Prerequisite: GEOL 4223.

GEOL5132 Ammonoid Biostratigraphy (Irregular) Laboratory study of the biology, taxonomy and biostratigraphy of Paleozoic ammonoid cephalopods. Pre- or Corequisite: GEOL 5123.

GEOL5142 Conodont Biostratigraphy (Irregular) Laboratory study of the biology, taxonomy, and biostratigraphy of the conodonts. Pre- or Corequisite: GEOL 5123.

GEOL5153 Environmental Site Assessment (Irregular) Principles, problems, and methods related to conducting an environmental site assessment. An applied course covering field site assessment, regulatory documentation, and report preparation. Prerequisite: GEOL 4033.

GEOL5163 Hydrogeologic Modeling (Irregular) Topics include numerical simulation of ground water flow, solute transport, aqueous geochemistry, theoretical development of equations, hypothesis testing of conceptual models, limitations of specific methods, and error analysis. Emphasis on practical applications and problem solving. Prerequisite: GEOL 4033 and computer literacy.

GEOL5223 Sedimentary Petrology (Fa) Sediments and sedimentary rocks. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: GEOL 4223.

GEOL5263 Hydrochemical Methods (Sp) Collection, analytical and interpretation techniques and methods for water, including quality control and quality assurance. Prerequisite: CHEM 1123 and CHEM 1121L.

GEOL5413 Planetary Geology (Irregular) Exploration of the solar system, geology and stratigraphy, meteorite impacts, planetary surfaces, planetary crusts, basaltic volcanism, planetary interiors, chemical composition of the planets, origin and evolution of the Moon and planets.

GEOL5423 Remote Sensing of Natural Resources (Odd years, Sp) Advanced course in remote sensing technology with special emphasis on interpretive techniques for resource management and research. Prerequisite: GEOL 4413.
GEOL5444 Advanced Petroleum Geology (Even years, Sp) Advanced well logging techniques, quantitative analysis, and subsurface correlation. Lecture 3 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: GEOL 4253.
GEOL5533 Marine Geology (Fa) Geological principles as applied to the study of the world's ocean basins. Course includes basic theories of ocean basin evolution, continental margin evolution, coastal geologic processes, and methods of study of deep sea records of global change and paleoceanography. Corequisite: Lab component. (Same as ENDY 5533)
GEOL5543 Tectonics (Fa) Development of ramifications of the plate tectonics theory. Analysis of the evolution of mountain belts. Lecture 3 hours per week. Prerequisite: GEOL 3513 and GEOL 3511L.
GEOL560V Graduate Special Problems (Sp, Su, Fa) (2-6) Library, laboratory, or field research in different phases of geology. May be repeated for 4 hours.
GEOL600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

Geosciences (GEOS)

GEOS4413 Principles of Remote Sensing (Fa) Theoretical and practical consideration of radar imagery, aerial photography, and infrared imagery for understanding Earth resource problems related to agriculture, archeology, engineering, forestry, geography, and geology. Corequisite: GEOS 4410L. Prerequisite: GEOL 1004 and GEOL 1113 or GEOL 3002. (Same as GEOL 4413)
GEOS4563H Honors Geology of Our National Parks (Fa) This course examines the underlying geology responsible for selected parks, and explores the interplay of geology, biology, climate, topography, and humans to evaluate the value of the parks, and to anticipate the problems they will face in the near and long-term. Prerequisite: GEOL 1113. (Same as GEOS 4563)
GEOS4563 Geology of Our National Parks (Fa) This course examines the underlying geology responsible for selected parks, and explores the interplay of geology, biology, climate, topography, and humans to evaluate the value of the parks, and to anticipate the problems they will face in the near and long-term. Prerequisite: GEOL 1113. (Same as GEOS 4563H)
GEOS4633 Near Surface Prospection (Sp) Geophysical remote sensing methods are investigated for detecting and mapping subsurface features up to 5m in depth. Magnetometry, resistivity, conductivity, ground-penetrating radar, and other methods are examined with a particular focus on their use for understanding archeological deposits. Requires use of instruments, computer skills, and field trips. Prerequisite: ANTH 4553 or GEOG 4553 or ANTH 4573 or GEOG 4573 or GEOG 4543 and GEOL 1113 and ANTH 3023. (Same as ANTH 4633)
GEOS4693H Honors Environmental Justice (Sp) This course deals with the ethical, environmental, legal, economic, and social implications of society's treatment of the poor, the disenfranchised, and minorities who live in the less desirable, deteriorating neighborhoods, communities, and niches of our country. The class integrates science with philosophy, politics, economics, policy, and law, drawing on award-winning films, current news, and case studies. (Same as GEOS 4693)
GEOS4693 Environmental Justice (Sp) This course deals with the ethical, environmental, legal, economic, and social implications of society's treatment of the poor, the disenfranchised, and minorities who live in the less desirable, deteriorating neighborhoods, communities, and niches of our country. The class integrates science with philosophy, politics, economics, policy, and law, drawing on award-winning films, current news, and case studies. (Same as GEOS 4693H)
GEOS4733 GPS Geodesy in Geoscience (Even years, Sp) Applications of GPS geodesy in geosciences are presented with emphasis on case studies of on-going research projects such as seismic and volcanic hazard. Statistical procedures and factors affecting data quality will be discussed. Analysis will focus on archived data, on-line data from GPS research networks, and data collected by students. Lecture 2 hours, laboratory 2 hours per week. Prerequisite: GEOL 1113.
GEOS5053 Quarternary Environments (Fa) An interdisciplinary study of the Quarternary Period, including dating methods, deposits, soils, climates, tectonics, and human adaptation. Lecture 2 hours, laboratory 2 hours per week.(Same as ANTH 5053, ENDY 5053, GEOG 5053). Prerequisite: graduate standing.
GEOS5853 Environmental Isotope Geochemistry (Sp) Introduction to principles of isotope fractionation and distribution in geologic environments, isotopic analytical methods, and extraction of isotope samples; application of isotopes in characterization of geologic processes and interaction with hydrologic, surficial, and biologic attenuation, paleothermometry soil, and biogeochemical processes. Prerequisite: GEOL 5063 or GEOL 5263. (Same as ENDY 5853) May be repeated for 3 hours.

GERMAN

See Foreign Languages, page 107.

GERONTOLOGY (GERO)

Ro DiBrezzo and Barbara B. Shadden
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Biological Sciences Faculty:
- Professor Etges

Communication Faculty:
- Professor Webb

Educational Leadership, Counseling and Foundations Faculty:
- Assistant Professor Brescia

Health Science, Kinesiology, Recreation and Dance Faculty:
- University Professor DiBrezzo
- Professor Fort

Human Environmental Sciences Faculty:
- Professor Turner
- Associate Professors Bailey, Fitch-Hilgenberg, Gentry, Webb
- Assistant Professor Killian

Nursing Faculty:
- Associate Professor Lawson

Psychology Faculty:
- Associate Professor Freund

Rehabilitation, Human Resources and Communication Disorders Faculty:
- Professors Shadden, Watson
- Associate Professor Toner
- Assistant Professor Hagstrom

Social Work Faculty:
- Associate Professor DeCoster

Graduate Certificate Offered:

Gerontology (non-degree)

The Graduate Certificate in Gerontology is an interdisciplinary graduate program focusing on the needs and concerns of the aging population.

Prerequisites to the Certificate Program: Students must be admissible to the Graduate School.

Requirements for the Graduate Certificate in Gerontology: (18 hours)

HESC 4443 Gerontology
GERO 5013 Field Experience in Gerontology
GERO 5023 Critical Issues in Aging
One course in each of the following categories, with the approval of the advisory committee:
Psychosocial Aspects of Aging
Physiological/Health Aspects of Aging
Practice/Policy Aspects of Aging

Gerontology (GERO)

GERO4443 Gerontology (Sp) Physiological and psychological development of the aging individual, extended family relations, service networks for the elderly, and retirement activities. Some attention to housing and care needs of persons in advanced years. Lecture 3 hours per week. Seminar. Prerequisite: instructor consent.
GERO5013 Field Experience in Gerontology (Irregular) Supervised research/practical experience in field setting. May be repeated for 6 hours. Prerequisite: graduate standing. May be repeated for 6 hours.
GERO5023 Critical Issues in Aging (Irregular) Consideration of current issues of aging not covered in depth in other courses. May be repeated for 6 hours. Prerequisite: graduate standing. May be repeated for 6 hours.

HEALTH SCIENCE (HLSC)

Sharon Hunt
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Degrees Conferred:

M.S., Ph.D. (HLSC)

Areas of Concentration: Community health; patient education; corporate health promotion; health counseling; and school health.

Prerequisites to Degree Program: For acceptance to the master's degree programs, the program area requires in addition to the general requirements for admission to the Graduate School, an undergraduate degree in Health Science or in a related field and the following admission standards: an overall undergraduate GPA of 3.00 (or if the overall undergraduate GPA is between 2.70 and 2.99, the student must have a 3.00 GPA on the last 60 hours of undergraduate course work, excluding student teaching, or a GRE score of 1000 on the combined verbal and quantitative parts of the general test).

Requirements for the Master of Science Degree: Candidates for the Master of Science degree in Health Science must complete 27 semester hours of graduate work and a thesis or 33 semester hours without a thesis. The corporate health promotion concentration requires 39 semester hours of graduate work and a thesis or 45 semester hours without a thesis. Students selecting the non-thesis option are required to complete three hours of HLSC 589V Independent Research. In addition to the program requirements listed below, all degree candidates must successfully complete a written comprehensive examination. A graduate GPA of 3.00 or higher is required for graduation.

Community Health Course Concentration: (33 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education & Health Professions, or
  EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (15)
- HLSC 5563 Public Health, or
  HLSC 5633 Health Service Admin.
- HLSC 5573 Principles of Health Education
- HLSC 5613 Principles of Epidemiology
- HLSC 5623 Health Planning
- HLSC 6333 Health Behavior Research, or
  HLSC 5353 Health Counseling, or
  HLSC 699V (3) Seminar

Required Internship (3)
- HLSC 574V Internship

Required Project or Thesis (3-6)
- HLSC 589V Independent Research (master's degree project), or
  HLSC 600V Master's Thesis

Approved Electives (3-6)

Patient Education Course Concentration: (33 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or
  EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (15)
- HLSC 5353 Health Counseling
- HLSC 5563 Public Health, or
  HLSC 5613 Principles of Epidemiology
- HLSC 5573 Principles of Health Education
- HLSC 5623 Health Planning, or
  HLSC 5633 Health Service Admin.
- HLSC 6333 Health Behavior Research, or
  HLSC 699V (3) Seminar

Required Internship (3)
- HLSC 574V Internship

Required Project or Thesis (3-6)
- HLSC 589V Independent Research (master's degree project), or
  HLSC 600V (Master's Thesis)

Approved Electives (3-6)

Corporate Health Promotion Course Concentration: (45 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or
  EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (12)
- HKRD 5983 Health Promotion at the Workplace
- HLSC 5353 Health Counseling
- HLSC 5573 Prin of Health Education
- HLSC 5623 Health Planning

Business Administration/Communication Component (9)
Selected from the following with approval of adviser:
- RECR 5883 Recreation Services Promotion
- MKTG 5433 Consumer and Market Research
- HKRD 5893 Public and Private Finance in HKRD
- RECR 6533 Legal and Political Aspects
- HKRD 5873 Leadership in HKRD Services
- COMM 5403 Organizational Communication Theory
- JOUR 5063 Issues in Advertising and Public Relations

Behavioral Sciences Component (6)
Selected from the following with approval of adviser:
- EDFD 5393 Statistics in Education and Health Professions
- PSYC 4133 Behavior Modification
- PSYC 5163 Personality: Theory & Disorder
- PSYC 4073 Psychology of Learning
- SOCI 5153 Sociological Perspectives on Social Psychology

Required Project or Thesis (3-6)
- HLSC 589V Independent Research (master's degree project), or
  HLSC 600V Master's Thesis

Approved Electives (6-9)

Health Counseling Course Concentration: (52 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or
  EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Counseling Courses (28)
- CNED 5203 Foundations of the Counseling Profession
- CNED 5213 Lifestyle & Career Development
- CNED 5303 Individual Appraisal
- CNED 5323 Counseling Theory
- CNED 5333 Basic Counseling Techniques
- CNED 5343 Counseling Practicum
- HLSC 5353 Health Counseling
- CNED 5363 Dynamics of Group Counseling
- CNED 5373 Ethical and Legal Issues in Counseling
- CNED 599V Seminar

Program Core Courses (3)
- HLSC 5573 Principles of Health Education

Internship (6)
- CNED 574V Counseling Internship

Required Project or Thesis (3-8)
HLSC 589V Independent Research (master's degree project), or
HLSC 600V Master's Thesis
Approved Electives (0-6)

School Health Course Concentration: (33 hours)
Required Research Component (6)
EDFD 5393 Statistics in Education and Health Professions, or
EDFD 6403 Educational Statistics and Data Processing
HKRD 5353 Research in HKRD
Remaining Education Core (6)
CNED 5203 Foundations of the Counseling Profession
ETEC 5213 Introduction to Ed. Media
EDFD 5373 Psychological Foundations of Teaching and Learning
EDFD 5303 Historical Found. of Modern Ed., or
EDFD 5353 Philosophy of Education
Required Courses (9)
HLSC 5553 School Health Program
HLSC 5573 Prin of Health Education
HKRD 5373 Problems in HKRD
Required Project or Thesis (3-6)
HLSC 589V Independent Research (master's degree project), or
HLSC 600V Master's Thesis
Approved Electives (6-9)

Prerequisites to the Ph.D. Degree Program: The applicant must have completed a master's degree or its equivalent in health science or a closely related field and meet general admission requirements of the Graduate School. An application should include identification of applicant's objectives, supportive background information including three letters of recommendation supporting the applicant's ability to successfully pursue a Ph.D. in health science; a GPA of at least 3.00 on all graduate course work; and an acceptable score on the Graduate Record Examinations (GRE). Additional prerequisites may be prescribed after review of application materials. Furthermore, applicants who present a GRE score of 1200 or greater on the combined verbal/quantitative portions, a GRE writing score of 5.5 or greater, a minimum overall GPA of 3.85 and faculty approval may apply for admission to the Ph.D. Health Science program after completion of their bachelor's degree.

Requirements for the Doctor of Philosophy Degree: A minimum of 96 graduate hours beyond the bachelor's degree is required. A doctoral advisory committee will be established by the student in consultation with the Coordinator of Graduate Study during the first semester of enrollment subsequent to acceptance into the degree program. The student, in conjunction with the advisory committee, will define the program of study. The degree program requires successful completion of candidacy examinations, an acceptable dissertation, and an oral defense of the dissertation. These last requirements are described elsewhere in this catalog on page 43. Further requirements of the Doctor of Philosophy degree in health science include the following:

Departmental Core Requirements
Required Prerequisites: (12)
HLSC 5573 Principles of Health Education
HLSC 5563 Public Health
HLSC 5613 Principles of Epidemiology I
HLSC 5623 Health Planning
Required Courses: (6)
HLSC 6333 Health Behavior Research
HLSC 6803 Health Communication Theory, Research and Practice
Nine hours from the following:
HLSC 6553 Environmental Health
HLSC 6733 Health and the Aging Process
HLSC 6833 Principles of Epidemiology II
HLSC 699V Seminar (3)
Research and Statistical Requirements
Required Prerequisites: (6)
HKRD 5353 Research in HKRD
EDFD 5393 Statistics in Education and Health Professions, or
EDFD 6403 Educational Statistics/Data Processing
(or equivalent)
Required Courses: (6)
EDFD 6413 Experimental Design in Education
EDFD 6423 Multiple Regression Techniques for Education
Additional Courses (9)
Selected from the following with the approval of adviser:
EDFD 6533 Qualitative Research
EDFD 6453 Applied Multivariate Statistics
EDFD 6623 Techniques of Research in Education
EDFD 6653 Measurement and Evaluation
EDFD 699V (3) Seminar
HKRD 699V (3) Seminar
*Other adviser approved 5000- or 6000-level research and/or statistics courses.

Field of Study (9)
Students, in consultation with their doctoral advisory committee, will identify further course work comprising a field of study in health science, consistent with the goals and objectives of the students and institution. Course work may be selected from several related disciplines or a single discipline.

Health Sciences (HLSC)

HLSC4603 Application of Health Behavior Theories in Health Education (Fa) Understanding the reasons for health behavior is vital for the health education professional. It is necessary to assist in the development of services and programs that are likely to move an individual from an unhealthy behavior to one that is more appropriate for a healthy lifestyle. This course surveys the major health behavior theories used in health education and applications of the theories will be used in the class.
HLSC4613 Principles of Epidemiology (Fa) Distribution and patterns of disease or physiological conditions within populations; an examination of the nature of epidemiological research. Prerequisite: Senior standing and BIOL 2013 and BIOL 2011L. May be repeated for 6 hours.
HLSC4623 Human Diseases (Fa) (Formerly HLSC 3623) An examination of the variety, behavior, distribution, and management of both infectious and noninfectious diseases in human populations. Prerequisite: BIOL 1603 (or BIOL 1543 and BIOL 1541L).
HLSC5353 Health Counseling (Su) A review of the role and function of the health counselor including a focus on problem solving approaches for coping with daily problems of living, decision making, and life style planning.
HLSC5543 Contemporary Issues in Human Sexuality (Irregular) Indepth analysis of the social, biological, and behavioral factors associated with the development of one's sexuality.
HLSC5553 School Health Programs (Irregular) Study of program content, program organization, and administrative details in planning and conducting a school program which includes healthful school living, health services, and health instruction.
HLSC5563 Public Health (Sp) Acquaints the student with the structure, functions, and major problems in public health and with the role of education in public health.
HLSC5573 Principles of Health Education (Sp, Su, Fa) Current trends, basic issues, controversial issues, and fundamental principles of health education.
HLSC5583 Voluntary Health Agencies (Irregular) Introduction to a variety of voluntary health agencies in the community. Opportunities to visit these agencies will be provided. Purpose, objectives, functions, and programs will be presented by representatives of selected agencies.
HLSC560V Workshop (Irregular) (1-6) May be repeated for 6 hours.
HLSC5623 Health Planning (Even Years, Sp) Emphasis is on examination of health planning processes, principles, and concepts. Methods for health planning agencies, issues in comprehensive health planning, and analysis of decision making steps for program implementation will be addressed.
HLSC5633 Health Services Administration (Irregular) Emphasis is on an examination of administrative factors related to health services. Administrative and professional authority, boards, consumers, delivery of services, federal role, and cost containment will also be addressed.
HLSC574V Internship (Irregular) (1-6) May be repeated for 6 hours.

HLSC589V Independent Research (Sp, Su, Fa) (1-6) Development, implementation, and completion of graduate research project. Prerequisite: M.S. degree in health science and HPER 5353 and EDFD 5393.
HLSC599V Seminar (Irregular) (1-3) May be repeated for 18 hours.
HLSC600V Master's Thesis (Sp, Su, Fa) (1-6)
HLSC605V Independent Study (Sp, Su, Fa) (1-6) Provides students with an opportunity to pursue special study of education problems. May be repeated for 6 hours.
HLSC6333 Health Behavior Research (Even Years, Fa) A review of human behavior and its relationship to health and well being. Focuses on contemporary health behavior research and instrumentation.
HLSC6443 Health & Health Care in Cross-Cultural Settings (Irregular) The relationship of socio-political and cultural factors to primary health care and public health in developed and developing countries is emphasized. Epidemiological factors influencing health status in various countries are reviewed.
HLSC6553 Environmental Health (Sp, Su, Fa) An analysis and evaluation of the various environmental factors that influence our health. Causes of problem factors are identified and solutions proposed for improving environmental conditions.
HLSC6733 Health and the Aging Process (Odd Years, Sp) An overview of the health-related issues facing elderly populations with indepth study of the biological and behavioral changes associated with aging.
HLSC674V Internship (Sp, Su, Fa) (1-3) Provide Ph.D. students with an individualized college teaching experience in collaboration with a faculty mentor. Enrollment concurrent with residency. Prerequisite: admission to the Ph.D. in Health Science degree program. May be repeated for 3 hours.
HLSC6803 Health Communication Theory, Research and Practice (Odd Years, Sp) This course is designed to acquaint you with the role of communication in health education and with basic principles and practices in interpersonal, group, and mass communication. Health communication theory will be discussed in the first part of the semester, followed by important research in the area of health communication, and finally putting to practice the material will be the terminal experience for the course.
HLSC6833 Principles of Epidemiology II (Even Years, Sp) Provides students with knowledge and skills necessary to design, conduct, and interpret observational epidemiological concepts, sources of data, prospective cohort studies, retrospective cohort studies, case-control studies, cross-sectional studies, methods of sampling, estimating sample size, questionnaire design, and effects of measurement error. Prerequisite: EDFD 5393 or EDFD 6403.
HLSC699V Seminar (Irregular) (1-3) Discussion of selected topics and review of current literature in the health sciences. Prerequisite: advanced graduate standing. May be repeated for 3 hours.

HEALTH SCIENCE, KINESIOLOGY, RECREATION, AND DANCE (HKRD), DEPARTMENT OF

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- University Professors DiBrezzo, Young
- Professors Fort, Gorman, Hunt, Jones Riggs
- Visiting Professor van der Smissen
- Adjunct Professors Gagliardi, Guyton
- Associate Professors Langsner, Lirgg, Moiseichik, Turner
- Clinical Associate Professor Kern
- Assistant Professors Calleja, Hughes
- Clinical Assistant Professors Bonacci, Smith-Nix
- Adjunct Assistant Professor Blanch
- Instructor Edmonston

Degrees Conferred:

M.A.T., M.Ed. in Physical Education (PHED) (See Physical Education)
M.Ed. in Recreation (RECR) (See Recreation)
M.S., Ph.D. in Health Science (HLSC) (See Health Science)
M.S., Ph.D. in Kinesiology (KINS) (See Kinesiology)
Ed.D. in Education (RECR) (See College of Education; Recreation)

Health Sci, Kins, Recr (HKRD)

HKRD5353 Research in Health Science, Kinesiology, Recreation and Dance (Sp, Su, Fa) Methods and techniques of research in health education, physical education and recreation including an analysis of examples of their use and practice in their application to problems of interest to the student.
HKRD5373 Problems in Health Science, Kinesiology, Recreation, and Dance (Irregular) A study of current problems in the field of health education, kinesiology, and recreation.
HKRD560V Workshop (Sp, Su, Fa) (1-6)
HKRD5873 Leadership in HKRD Services (Su) Considers research, theory, and practical applications of leadership principles utilized in the provision of HKRD services. Focus is on motivation, attitude, communication, group dynamics, and problem solving.
HKRD5883 Sports Facilities Management (Fa) Considers basic elements and procedures in the planning, design, construction, operation, and maintenance of sport facilities; management considerations in conducting various types of events.
HKRD5893 Public and Private Finance in HKRD (Fa) Develops an understanding of both public and private finance management for students in public and private management positions. Provides an understanding of the budgeting processes and techniques used in obtaining and controlling funds, including private sector finance problems in areas of credit, pricing, indexing, and debt management.
HKRD5983 Health Promotion at the Workplace (Irregular) Examines specific strategies for health promotion programming, organizational and administrative schemes for program delivery, and appraisal systems for determining health programming priorities in workplace settings.
HKRD599V Seminar (Sp, Su, Fa) (1-6)
HKRD6133 Issues in HKRD (Irregular) A review of the significant social, demographic, behavioral, developmental, and technological issues that influence health, kinesiology, and recreation programs. Pre- or Corequisite: for doctoral level students only.
HKRD6233 Management in HKRD (Su) Deals with principles, procedures, relationships, problems, and current practices in the supervision of health education and kinesiology. Includes management of facilities, programs, personnel, and processes.
HKRD6333 Measurement in HKRD (Irregular) Competencies for analysis and application of evaluation and measurement in HKRD.
HKRD660V Workshop (Sp, Su, Fa) (1-6)
HKRD689V Directed Research (Sp, Su, Fa) (1-6) Laboratory investigations, in basic and applied research.
HKRD699V Seminar (Sp, Su, Fa) (1-3) May be repeated for 3 hours.
HKRD700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

HIGHER EDUCATION (HIED)

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- Professors Gearhart, Hammons, Lucas, Miller
- Associate Professor Murry
- Adjunct Associate Professor Brazzell
- Adjunct Assistant Professor Seabrooks

Degrees Conferred:

M.Ed. (HIED)
Ed.S., Ed.D. (EDUC)

Areas of Specialization: The Higher Education doctoral program prepares students for professional competence, leadership, and service in two areas: administration (including student personnel work) and college teaching. A third program option combining elements of both administration and college teaching also may be selected. Within these areas of specialization, practicing professionals as well

as persons entering the higher education field, may pursue programs emphasizing community colleges, four-year colleges and universities, or state, regional, or national agencies.

Prerequisites for Acceptance to the Program: In addition to meeting University requirements for admission to the Graduate School, all students seeking admission to the higher education program must complete program application procedures that include program application, three letters of reference, an autobiographical sketch, a sample of their writing ability, and for all educational specialist and doctoral applicants, a Miller Analogies or Graduate Record Examinations score and a personal interview with members of the higher education faculty.

Requirements for the Master of Education Degree: (Minimum 33 hours.) The master's degree program in higher education provides academic preparation for persons who plan to seek entry level positions at the director or assistant director level in both two-year and four-year institutions for which a master's degree is appropriate preparation, including community colleges and technical colleges, liberal arts colleges, and four-year colleges and universities. Depending upon prior experience, graduates may expect to find employment in a wide variety of positions in residence life, financial aid, career planning and placement, student activities, student union management, alumni affairs, development, public information, continuing education, financial management, human resources, and institutional research, or as adviser to fraternities and sororities, or minority students.

In combination with course work outside of Higher Education, students may prepare for positions in development and in other beginning level positions in post-secondary institutions and educational agencies.

The 33 graduate-semester-hour program (or 27 hours and a thesis) includes a minimum of 21 graduate semester hours in higher education, a minimum of 6 semester hours of adviser-approved electives, and 3 semester hours in research or statistics, Additionally, students with no prior experience in post-secondary institutions will be expected to complete one or more internships.

Requirements for the Educational Specialist Degree: Two options are available: one in college teaching and one in college administration. While both programs are designed primarily for persons currently employed in post-secondary education, they can, under certain circumstances, be used as pre-service preparation for persons presenting two years of relevant experience. Each option contains a minimum of 30 graduate semester hours including 15 semester hours in higher education, three semester hours in research or statistics, a written project, and a minimum of six graduate semester hours of approved electives from outside Higher Education (previous graduate work may be counted toward this requirement). Students enrolled in either specialization with no prior full-time experience directly in keeping with their goals will be required to complete one or more internships. A basic requirement for majors in college teaching is the completion of a minimum of 30 graduate semester hours of course work in one or more intended teaching field(s), including previous graduate work.

Requirements for the Doctor of Education Degree: Three program concentrations are offered: college teaching, administration, and a specialization combining elements of both. Each student's program of study includes 12 semester hours of higher education core courses, 9 semester hours of courses stipulated for an area of specialization, 6 semester hours of electives in higher education, 9 semester hours from outside higher education; and 9-12 semester hours in research methods and statistics. Programs for students in the administration specialization must contain nine graduate semester hours in courses outside higher education while those in the college teaching specialization must contain a minimum of 45 post-baccalaureate, graduate semester hours in a teaching field(s). Students without three years of relevant experience in their field(s) of intended endeavor will be required to complete one or more appropriate internships.

Higher Education (HIED)

HIED5003 Overview-American Higher Education (Fa) A basic course in the study of higher education open to all students seeking careers in colleges and universities. Serves as an introduction to the programs, problems, issues, and trends in higher education.

HIED5013 Community College Teaching II (Sp) Strategies for effective community college teaching. Topics include appropriate use of media, distance learning alternative learning and teaching strategies, the strengths and weaknesses of cooperative education, classroom management, serving the disabled student, and the responsibilities and roles of the community college faculty. Prerequisite: HIED 5003.

HIED5023 Community College Teaching Internship (Sp, Fa) Supervised field experiences in community college teaching. Corequisite: HIED 5013. Prerequisite: HIED 5003.

HIED5033 College Students and Student Personnel Services (Fa) Study of origins, functions, and policies in student personnel services in contemporary 2- and 4-year colleges and universities with emphasis on the student and student development.

HIED5043 The Student in Higher Education (Sp) Provides those who work or plan to work in post secondary educational institutions with an understanding of the student population in contemporary colleges and universities.

HIED504V Practicum in Higher Education (Sp, Su, Fa) (1-6) Students are assigned to a department or agency within or outside the university for professional experience under the joint supervision of on-site personnel and university faculty. Periodic meetings are scheduled for evaluation, discussion, and examination of techniques.

HIED5053 The Community-Junior College (Irregular) An overview of the community college. Topics include the history and philosophy of the community college movement, students, curriculum, state and local campus governance, teaching, student personnel work, finance and issues, problems, and trends.

HIED5073 Management of Higher Education Institutions (Su, Fa) Principles and concepts of management and their application in college and university settings.

HIED5083 History and Philosophy of Higher Education (Sp) An examination of the history and development of higher education including the study of the philosophy, objectives, and functions of various types of institutions.

HIED5173 Individual and Group Management Skills (Even years, Sp) Development of knowledge, skill, and confidence in personal management, interpersonal relations, and structured group facilitation in a higher education setting. Prerequisite: Graduate Standing. For students not enrolled in the Higher Education Leadership program, permission of the instructor.

HIED560V Workshop (Irregular) (1-6) Practical and concentrated consideration of selected topics of current interest to practitioners.

HIED574V Internship (Sp, Su, Fa) (1-3) Supervised field experiences in student personnel services, college administration, academic advising, institutional research, development, or other areas of college and university work.

HIED600V Master's Thesis (Sp, Su, Fa) (1-6)

HIED6013 The Professoriate: Problems and Issues (Sp) An examination of the vital issues and trends affecting college faculty personnel with emphasis upon institutional practices and policies.

HIED6023 Introduction to the Study of Higher Education (Sp, Fa) A requirement for all new doctoral and specialist students. Familiarization with writing requirements, library search procedures, library resources, and program requirements. Prerequisite: admission to Higher Education program (Ed.S. & Ed.D.)

HIED605V Independent Study (Sp, Su, Fa) (1-6) Provides students with an opportunity to pursue special study in higher education.

HIED6083 Management Skills for Effective Leadership (Irregular) Development of management skills that enhance leadership includes understanding yourself, managing yourself, team building, personnel selection, group and individual decision-making, problem solving, managing conflict, developing valid performance appraisal systems, conducting performance appraisal interview, and other topics of current interest. Prerequisite: Doctoral students in Higher Education or permission of the instructor.

HIED6093 Leading Change (Irregular) An in-depth examination of leadership, change, and culture inpostsecondary education.

HIED6183 Organization Development and Change in Higher Education (Irregular) An examination of the theory and practice of organization development as it relates to planned change in colleges and universities.

HIED6323 Design and Evaluation of College Teaching (Irregular) Theory and practice of effective college teaching. Emphasis is placed on preparation and evaluation of instruction.

HIED6333 Curriculum Design in Higher Education (Odd years, Fa) Types of undergraduate curricula and their supporting philosophies; approaches to curricula planning and assessment; curricular reforms; and factors influencing curricular policy making.

HIED6343 Strategies for Effective College Teaching (Even years, Sp) An examination of traditional and innovative instructional strategies for use in college teaching.

HIED6423 Trends, Issues and Problems in Higher Education (Odd years, Fa) A study of the current problems and trends related to the field of higher education.

HIED6653 Legal Aspects of Higher Education (Sp) An examination of the legal status of higher education in the United States; the rights and responsibilities of educators and students including fair employment; due process; torts liability and contracts; student rights landmark court decisions; federal and state legislation having an impact on education.

HIED6663 Finance and Fiscal Management (Sp) Higher education finance and budgeting practices: problems, issues, trends, and policy issues in higher education.

HIED6683 Governance and Policy Making in Higher Education (Odd years, Fa) An analysis of governance and policy making affecting the control of colleges and universities. Attention is given to policy generation, governing board supervision, and the impact

of institutional, professional, and regional groups as well as community, state, and federal pressures.
HIED6693 Research Techniques in Higher Education (Irregular) Techniques of research applicable to Higher Education
HIED674V Internship (Sp, Su, Fa) (1-6) Supervised field experiences in student personnel services, college administration, college teaching, institutional research, development, or other areas of college and university work.
HIED680V Ed.S. Project (Sp, Su, Fa) (1-18)
HIED699V Seminar (Sp, Su, Fa) (1-6) A series of seminar for specialized study into areas of current significance in postsecondary education, such as leadership and planning; organization, development, and change; human resource development and appraisal; the student in higher education; etc. May be repeated for 6 hours.
HIED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

HISTORY (HIST)

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- Distinguished Professors West, Woods
- Professors Bukey, Chappell, Cornell, Engels, Kennedy, Sutherland, Tsai, Whayne
- Associate Professors Coon, Finlay, Gordon, Robinson, Schweiger, Sonn, Starks, Tucker, Williams
- Assistant Professors Brogi, Sloan (K.)

Degrees Conferred:

M.A., Ph.D. (HIST)

Prerequisites to Degree Program: Graduate work in history at the master's level presupposes an undergraduate major in that subject of approximately 30 semester hours. In addition, students must have achieved a verbal score of 550 and a writing assessment score of 4.5 on the Graduate Record Examinations. Students who present a minimum of 30 hours may be admitted without deficiency. Students who present between 18 and 30 hours of history may be admitted with or without deficiency, subject to the determination of the department's Graduate Studies Committee. Students who present less than 18 hours of history may not be admitted without deficiency. The nature of the deficiency requirements will be determined by the Graduate Studies Committee.

Requirements for the Master of Arts Degree: Students seeking the Master of Arts degree must offer at least 30 hours of history at the 4000-level or above and HIST 5023 Historical Methods. Included in the 30 hours must be nine in American history and nine in European (or non-Western) history. Students who write a thesis must complete six hours of HIST 600V Master's Thesis and a minimum of nine hours of seminar (reading or research) or historiography. Students who do not write a thesis must complete three hours of research seminar and an additional nine hours of seminar (reading or research) or historiography. Students not electing to write a thesis must also pass a written examination in three regional-national fields.

Requirements for the Doctor of Philosophy Degree: Applicants are generally required to have a master's degree in history (or the equivalent) with a 3.20 grade-point average in graduate history courses and a verbal score of 550 and a writing assessment score of 4.5 on the Graduate Record Examinations. Applicants without a master's degree in history (or its equivalent) but with exceptionally strong qualifications, may be admitted directly into the Ph.D. program at the discretion of the Graduate Studies Committee of the Department of History.

During the first semester of study, all students will be assigned an advisory committee that will determine their particular programs. Students will select four fields of historical specialization. Students will also be required to meet the departmental language procedure in establishing competency in two foreign languages. At the discretion of the advisory committee, competency in statistics or quantitative analysis may be substituted for one of the languages.

After completing the course of study prescribed by their advisory committees and satisfying the language requirements, students may apply to take the candidacy examinations. These consist of written exams in each of the four specialized fields. When these examinations have been passed, students may apply for admission to candidacy.

All students must demonstrate a capacity for independent research by the writing of an original dissertation on a topic within their major area of study. Upon admission to candidacy, students will be assigned a dissertation committee with a major professor as chair to direct the research and writing. Under direction of the major professor, candidates will develop programs of reading in the general areas and research techniques pertinent to researching and writing their dissertations.

The student's final examination will be oral and will be primarily a defense of the dissertation.

Although the Doctor of Philosophy degree is primarily a research degree, most successful candidates engage in teaching as a major feature of their careers. Therefore, the department will make every effort to provide a candidate with teaching opportunities in the department before completion of the program.

History (HIST)

HIST4003 Greece and the Ancient Near East (Odd years, Fa) An introduction to the origins of civilization in the ancient Near East and Greece. Emphasis placed upon the development of agriculture and cities, Hebrew religious ethics, and Greek culture, political institutions, and thought.
HIST4013 Alexander the Great and the Hellenistic World (Even years, Sp) A survey of the achievements of Alexander and the culture of the new world he created. The personality and career of Alexander are examined as well as the rich diversity of the Hellenistic world: trade with India, religious syncretism, and the development of Hellenistic science and philosophy.
HIST4023 The Roman Republic and Empire (Even years, Fa) An introduction to Rome's cultural development from its origins as a small city state in the 8th century B.C. to its rule over a vast empire extending from Scotland to Iraq. Emphasis is placed upon the causes of Roman expansion during the Republic, the urbanization and Romanization of Western Europe, and the persecution and spread of Christianity.
HIST4043 Late Antiquity and the Early Middle Ages (Irregular) This course examines the political, spiritual, intellectual, and social-economic developments of European history, c. 300-1000 CE. Special topics include the Christianization of the late Roman Empire and Byzantium, as well as the formation of Celtic and Germanic Kingdoms in the West.
HIST4053 Late Middle Ages (Irregular) This course examines the political, social-economic, intellectual, and spiritual developments of European history, c. 1000-1400 CE. Special topics include monasticism, sacral kingship, the crusades, and the medieval university.
HIST4073 Renaissance and Reformation, 1300-1600 (Even years, Fa) Examines the history of Europe from the end of the Middle Ages through the Renaissance to the Reformation and Counter-Reformation. Special attention is paid to changes in popular piety, political thought, religious representation, and the discovery of the New World.
HIST4083 Early Modern Europe, 1600-1800 (Odd years, Sp) Begins with the upheaval of the reformation, moves through the crisis of the 17th century and culminates with the democratic revolution of the 18th century. Examines the consolidation of the European state system, the propagation of modern science, discovery of overseas worlds, and the advent of the Industrial Revolution.
HIST4103 Europe in the 19th Century (Irregular) European history from the Congress of Vienna to the outbreak of World War I, with emphasis on political and diplomatic history.
HIST4113 Twentieth Century Europe, 1898-1939 (Even years, Fa) Background and impact of World War I to the outbreak of World War II.
HIST4133 Society and Gender in Modern Europe (Odd years, Sp) Changing values and attitudes toward childhood, family life, sexuality, and gender roles in Europe from the Renaissance to the present. The social impact of the Industrial Revolution, urbanization,

demographic change, and the two world wars.

HIST4143 Intellectual History of Europe Since the Enlightenment (Even years, Fa) A survey of the major developments in European thought and culture since the emergence of Romanticism. Topics include Romanticism, Darwinism, Marxism, and Modernism.

HIST4163 Tudor-Stuart England (Even years, Fa) Examines the history of England from the Henrician Reformation of the early 16th century through the Glorious Revolution of 1688 to the early 18th century. The Elizabethan Renaissance, the rise of Puritanism, the Revolution of the 1640s and the creation of an overseas empire are given special consideration.

HIST4173 The Latin American City (Irregular) This course examines the social, political, and cultural aspects of the modern Latin American city from an interdisciplinary perspective. The course includes an introduction to urban studies concepts, and each semester is organized around a specific set of case studies.

HIST4183 Great Britain, 1780-1914: Industry and Empire (Even years, Sp) An inquiry into effects of industrialization, class consciousness and imperialism on British politics, culture and society during the Victorian Era.

HIST4193 Great Britain, 1901-1982: Empire to Welfare State (Even years, Sp) Consideration of Imperial Britain from the Angle-Boer conflict to the Falkland Islands War, with emphasis on the effects of the Great Depression and the emergence of the modern welfare state.

HIST4213 The Era of the French Revolution (Odd years, Fa) France from the salons of the Enlightenment to the Napoleonic Wars. The French Revolution will be explored in terms of politics and personalities, ideas and symbols, class and gender relations, and violence and terror.

HIST4223 France Since 1815 (Even years, Sp) Survey of French history from the overthrow of Napoleon to the 5th Republic, with emphasis on French politics, society, and culture.

HIST4243 Germany, 1789-1918 (Even years, Fa) Survey of Germany from Age of Absolutism to collapse of the Hohenzollern monarchy with emphasis upon political, social, and economic developments.

HIST4253 History of Germany, 1918-1949 (Fa) Survey of Germany from advent of the Weimar Republic to 1949 with emphasis upon the failure of democratic government in the 1920s, the National Socialist dictatorship, and the division of Germany into two separate states.

HIST4283 Russia to 1861 (Fa) Study of the political, social and cultural development of Russia through the Napoleonic invasion.

HIST4293 Russia Since 1905 (Sp) Survey of political, cultural and intellectual trends in modern Russia with emphasis upon the Revolutions of 1917, the Soviet Union, and its successor states.

HIST4313 Islamic Theology and Philosophy, 650-1700 (IR) Doctrines and main figures in Islamic theology and philosophy from the origins of Islam through the seventeenth century C.E.

HIST4353 Middle East, 600-1250 (Even years, Fa) An examination of the origins of modern Middle Eastern societies-Arabic, Turkish, and Persian-with emphasis upon the development of the Islamic faith and culture.

HIST4373 Mongol & Mamluk Middle East 1250-1520 (Even years, Sp) An examination of Egypt, the Fertile Crescent, and Iran in the period of the Turco-Mongol military elites. Special attention given to the rise of slave and free governments and their roles in shaping Middle East political and social patterns.

HIST4383 The History of Sub-Saharan Africa (Irregular) A survey of the history of the major political, economic, and social institutions of Africa with the major emphasis on the civilizations of West Africa.

HIST4393 The Ottoman Empire and Iran 1300-1722 (Odd years, Sp) An examination of Ottoman government and society in the {Classical Period{ as well as a survey of Iranian history from 1300 to 1722. Special attention given to the Ottoman ruling structure, religious-legal establishment, and Ottoman conquests in the Balkans and Arab world.

HIST4413 New Women in the Middle East (Sp, Odd Years) This course covers the transformation of social and cultural roles of women in the Middle East since the 19th Century. Emphases include political emancipation, religious reformation, artistic representation, and gendered re-definition.

HIST4423 The Mediterranean World (Even years, Fa) An introduction to the Mediterranean as a region, including both its northern and southern shores. Cultural, economic, and political themes are pursued regionally from the 16th century until present.

HIST4433 Social and Cultural History of the Modern Middle East (Odd years, Sp) An analysis of Middle East history in the 17th-20th centuries which focuses on the social transformation of urban and rural life. Particular emphasis is given to the roles of economics, genealogy, art, and popular culture.

HIST4453 American Ethnic History (Sp, Su, Fa) Covers issues of ethnicity and assimilation not covered in courses on African-American and Native American history. Focus is threefold: the experience of immigrants and their descendants; the reactions of government, popular movements, and influential opinion-makers to immigrants; and changes in immigration policy.

HIST4463 The American Frontier (Sp) American westward expansion and its influence on national institutions and character. Emphasis on the pioneer family and the frontier's role in shaping American society, culture, economy, and politics. Topics include exploration, the fur trade, the cattle kingdom and the mining, farming, and military frontiers.

HIST4473 Environmental History (Irregular) Examines the interactions between human culture and the natural environments: Concepts of nature in the West and elsewhere, dynamics of the Physical Environment, case studies in Regional Environmental History and the Politics of Environmental movements.

HIST4493 Religion in America to 1860 (Irregular) History of religion in early America, primarily from a social and cultural perspective. Topics will include region, social class, growth of institutions, slavery, print culture, and social reform in traditions including Protestantism, West African religion, Catholicism, Native American religion, and Judaism.

HIST4503 History of Political Parties in the United States, 1789-1896 (Even years, Fa) Origin and development of the American party system from the implementation of the constitution to the election of McKinley.

HIST4513 History of Political Parties in the United States Since 1896 (Odd years, Sp) Response of the party system to America's emergence as an industrial nation and world power from the election of 1896 to present.

HIST4533 American Social and Intellectual History to 1865 (Fa) Survey of significant ideas and institutions from Colonial times through the Civil War with emphasis upon religious, educational, literary, and scientific developments.

HIST4543 American Social and Intellectual History Since 1865 (Irregular) Survey of thought and society since the Civil War with emphasis upon the nature of American life in the 20th century.

HIST4563 The Old South, 1607-1865 (Odd years, Fa) Survey of the political, social, and economic development of the antebellum South.

HIST4573 The New South, 1860 to the Present (Even years, Fa) Survey of the development of the Civil War and postwar South to the present.

HIST4583 Arkansas in the Nation (Fa) Designed to provide advanced undergraduate and graduate students with a comprehensive understanding of the full sweep of Arkansas history. The focus will be on social, economic and political history, and historiography.

HIST4613 Colonial America to 1763 (Fa) Political, economic, and social history of colonial development from the time of contact to the Treaty of Paris, with primary, but not exclusive, emphasis upon Anglo-America. (Same as HIST 4613I)

HIST4623 Revolutionary America, 1763 to 1801 (Sp) Political, economic, and social history of Revolutionary and post-Revolutionary America and the evolution of the new nation, with a particular emphasis upon the emergence on constitutional traditions.

HIST4643 Early American Republic, 1801-1828 (Sp, Fa) History of the early United States emphasizing social and cultural perspectives. Topics addressed will include westward expansion, slavery, religion, and economic change.

HIST4653 Antebellum America, 1828-1850 (Sp, Fa) History of antebellum U.S. emphasizing social and cultural perspectives. Topics addressed will include slavery, religion, gender, the market economy, regionalism, and political developments.

HIST4663 Rebellion to Reconstruction, 1850-1877 (Even years, Sp) A survey of political, social, and economic issues from the late antebellum period through Reconstruction. Emphasis is placed on the causes of the Civil War and the problems of post-war America. A brief examination of the Civil War is included.

HIST4673 The American Civil War (Fa) An intensive study of the political, social, military, and economic aspects of the American Civil War period.

HIST4683 The Business Corporation in American Life and Thought (Even Years, Sp) The legal, social and political background of the business corporation, seeking explanations as to why the corporation became the dominant form of economic organization by the late nineteenth century. The course will also examine the social and political effects of corporate power.

HIST4703 Emergence of Modern America, 1876-1917 (Fa) A survey of the impact of the Industrial Revolution, Imperialism, and progressivism upon American life and institutions.

HIST4723 America Between the Wars, 1917-1941 (Sp) The impact of World War I, the 1920s, and the Great Depression upon American society and culture.

HIST4733 Recent America, 1941 to the Present (Sp) A general survey of American history since World War II with emphasis upon the presidency, reform movements, the Cold War, and cultural developments.

HIST4753 Diplomatic History of the United States, 1776-1900 (Odd Years, Fa) Survey of American foreign relations from the American Revolution through the Spanish-American War. Principal topics include isolationism, freedom of the seas, manifest destiny and continental expansion, overseas expansion, and the diplomacy of war and peace. Emphasis on the relationship between domestic politics and foreign affairs. Prerequisite: HIST 2003.

HIST4763 Diplomatic History of the United States, 1900-1945 (Even Years, Sp) America's development as a world power. The course examines U.S. relations with Europe, Latin America, and East Asia, plus America's first approach to the Middle East. Particular emphasis is placed on America's involvement in World War I and World War II. Prerequisite: HIST 2013.

HIST4773 Diplomatic History of the US, 1945 to Present (Fa) U.S. involvement in world affairs since WWII. The Cold War from an international perspective, including strategies, nuclear deterrence, conflicts, economic developments, cultural relations among allies and adversaries. Post-Cold War scenarios, including war on terrorism.

HIST4783 History of Modern Mexico (SP, Even Years) This course examines the history of Mexico from the wars of independence to the present. Emphasis will be placed on the turbulent nineteenth century and the Mexican Revolution. Themes covered include colonial legacies, national identities, popular culture, emigration, and relations with the United States. May be repeated.

HIST4813 History of China to 1644 (Odd years, Fa) (Formerly HIST 4313) A history of pre-modern China, including the study of Confucianism, Taoism and Buddhism.

HIST4823 Modern China (Odd years, Sp) (Formerly HIST 4323) Survey of Chinese culture, society, government and diplomacy between 1644 and 1912.

HIST4833 Chinese Revolutions (Even years, Fa) (Formerly HIST 4333) A study of political, cultural, economic, and social revolutions in China since 1900.

HIST4843 Modern Japan (Irregular) (Formerly HIST 4843) Survey of Japanese history since 1859 to the downfall of Tokugawa shogunate through the two world wars to the rise of an economic superpower. Emphasis is placed on Japanese economic, social, and political questions, including their successes and costs.

HIST5023 Historical Methods (Fa) Practical introduction to historical research and writing. Consists of lecture, library reading, and class criticism of research papers. Prerequisite: graduate standing.

HIST5043 Historiography (Sp) Survey of the history of historical writing and a study of the important schools and historical interpretation. Prerequisite: graduate standing.

HIST5053 Reading Seminar in Asian History (Sp, Su, Fa) Concentrated reading in selected specialized areas of Asian history. Prerequisite: advanced graduate standing.

HIST506V Readings in European History (Sp, Su, Fa) (1-6) Prerequisite: gradu-

ate standing.
HIST507V Readings in American History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.
HIST508V Research Problems in European History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST509V Research Problems in American History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST5103 Reading Seminar in American History (Sp, Su, Fa) Historiographical and bibliographical study of special areas of U.S. history, such as the Age of Jackson, the Civil War, etc. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5123 Research Seminar in American History (Sp, Su, Fa) Research projects in selected fields of American history, such as the Civil War, the Age of Jackson, etc. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5133 Reading Seminar in European History (Sp, Su, Fa) Historiographical and bibliographical study of special periods in European history, such as the Roman Empire, the late Middle Ages, the French Revolution, etc. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5143 Research Seminar in European History (Sp, Su, Fa) Research projects in selected fields of European history, such as the French Revolution, humanism, etc. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5163 Research Seminar in British History (Sp, Su, Fa) Research projects in selected fields of British history.
HIST517V Readings in Asian History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST519V Readings in Near Eastern History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST520V Research Problems in Near Eastern History (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST5213 Reading Seminar in Middle Eastern History (Sp, Su, Fa) Historiographical and bibliographical study of special areas of Middle Eastern history. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5233 Research Seminar in Middle Eastern History (Sp, Su, Fa) Research projects in selected fields of Middle Eastern history. Prerequisite: graduate standing. May be repeated for 3 hours.
HIST5313 Reading Seminar in Latin American History (SP) Historiographical and bibliographical study of special areas in Latin American history. Prerequisite: Graduate standing. May be repeated.
HIST5323 Research Seminar in Latin American History (SP) A research seminar for the production of a major research project in Latin American history. Prerequisite: Graduate standing. May be repeated.
HIST560V Teaching Foreign Cultures in Social Studies Curriculum (Su) (1-6) Extensive examination of foreign cultures (West Europe, USSR, China, Latin America) and methods of teaching about them in secondary school social studies. Four week residential summer institute. (Same as PLSC 560V)
HIST600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
HIST700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy. May be repeated for 18 hours.

HORTICULTURE (HORT)

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- Professors Clark, Hensley, Klingaman, Morelock, Murphy, Robbins, Rom
- Adjunct Professors Daniello, Murdoch
- Associate Professors Andersen, Evans, Garcia, Karcher, Lindstrom, Richardson, Srivastava
- Adjunct Associate Professors Perkins-Veazey, Rainey, Sambo, Thompson

Degree Conferred:

M.S. (HORT)
Ph.D. (PTSC) (See Plant Science)

The Department of Horticulture offers a thesis and non-thesis option for the M.S. degree. The non-thesis program was developed for continued and advanced education in horticulture management. The program is directed toward students entering careers in horticulture upon completion of the degree, or students requiring additional education for advancement in their careers.

Primary Areas of Faculty Research: Genetics and plant breeding of fruit, vegetable, or ornamental crops; physiology, management and production of fruit, vegetable, greenhouse, or ornamental crops and landscape plantings; physiology and management of turfgrasses; and biotechnology.

Prerequisites to Master of Science Degree Program (Thesis Option): A candidate must have a B.S. degree from an accredited institution with a background in physical and biological sciences, horticulture, and supporting agricultural disciplines. The student will work with a major adviser, who will arrange a committee to evaluate the student's background and plan a program of study with the student.

Requirements for the Master of Science Degree (Thesis Option): A minimum of 24 semester hours of graduate level course work and 6 hours of thesis are required, in addition to any deficiency courses that may be specified. The student's advisory committee will also serve as the thesis and oral examination committee.

Prerequisites to Master of Science Degree Program (Non-thesis Option): Students seeking to pursue the non-thesis option must meet all admission criteria for the UA Graduate School. Applicants should have completed a B.S. or B.A. degree and have had course work in plant sciences, biology, botany, horticulture, or three years of experience in a plant science related career. Additionally, students seeking admission into the M.S. non-thesis option must submit three letters of reference regarding academic and professional experiences and potential. No professional examinations are required for admission.

Requirements for the Master of Science Degree (Non-thesis Option): A minimum of 30 hours of graduate course work as approved by the student's academic advising committee and within the requirements prescribed below. Specific Degree Requirements follow:

A. Horticulture Block – A minimum of 20-21 hours including:
   3 hours HORT 503v Special Project
   1 hour HORT 5001 Seminar
   9 hours HORT Courses
   BIOL 4304/4300L Plant Physiology
   AGST 4023 Principles of Experimentation, or
   AGST 5014 Experimental Design
B. Plant and Agricultural Science Block – A minimum of 8-9 hours including: Course work in BIOL, CSES, AGST, PLPA, PTSC, ENTO, AGEC, AGME, AGED, LARC, or HORT.
C. Students must pass a written and oral examination to be given by their advising committee upon completion of their course work and submission of special project.

The Ph.D. program in plant science is an interdepartmental program involving the Departments of Horticulture and Plant Pathology. The dissertation and most of the course work may be completed in horticulture. See page 149 for graduate courses in Plant Science.

Horticulture (HORT)

HORT400V Special Problems (Sp, Su, Fa) (1-6) Original investigations on assigned problems in horticulture. Prerequisite: junior standing.
HORT401V Special Topics in Horticulture, Turf or Landscape (Irregular) (1-6) Topics related to horticulture, turfgrass or landscape science or management not covered in other courses or a more intensive study of a specific topic. May be repeated for 99 hours.
HORT402V Horticulture Judging and Competition Activity (Irregular) (1-6) Training for and participation on horticultural identification, judging and competitive teams. Repeatable for up to 4 credits. Prerequisite: HORT 2003. May be repeated for 4 hours.
HORT4033 Professional Landscape Installation and Construction (Even years, Fa) Principles and practices involved in landscape installation and construction. Topics covered include sequencing construction activities, protecting existing trees, landscape

soils, selecting plants, planting and transplanting plant materials, wood construction, cement and masonry construction, and low-voltage lighting. Lecture 3 hours per week. Preparatory training in agribusiness or business is suggested. Prerequisite: HORT 2003 and HORT 3103.

HORT4043 Professional Landscape Management (Odd years, Fa) (Formerly HORT 3123) Principles and practices of landscape management and maintenance. Topics include low maintenance and seasonal color design, pruning and hazard tree management, water and fertilizer management, pesticide use, and other maintenance activities. Basic elements of marketing, specifications and contracts, estimating, personnel management, and equipment selection and acquisition relevant for landscape services will be introduced. Preparatory training in agribusiness or business is suggested. Prerequisite: HORT 2003 and HORT 3103.

HORT4103 Fruit Production Science and Technology (Odd Years, Sp) The management technologies and cultural practices of fruit crops including (but not limited to) blueberries, blackberries, raspberries, strawberries, grapes, peaches, and apples will be presented. The underlying scientific principles of crop genetics, nutrition, and physiology will be presented as a basis for making management decisions in fruit crop productions. Corequisites: Lab component. Prerequisites: HORT 2003.

HORT4403 Plant Propagation (Even years, Sp) Principles of plant propagation using seeds, cuttings, grafting, budding, layering, and tissue culture. The physiological basis of propagation is described. Knowledge of plant growth and physiology is needed. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.

HORT4503 Nursery Management (Irregular) Principles and practices in the production and handling of woody ornamental stock; management of the retail nursery and garden center. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: HORT 2003.

HORT4603 Practical Landscape Planning (Even years, Sp) Ornamental planting design and landscape planning concepts. Preparing planting plans, materials sheets, and cost estimates for residential properties. Prerequisite: HORT 3103.

HORT4701L Greenhouse Management and Controlled Environment Horticulture Laboratory (Odd years, Fa) Laboratory involving hands-on experiments designed to demonstrate principles discussed in the lecture section. Includes field trips. Corequisite: HORT 4703.

HORT4703 Greenhouse Management and Controlled Environment Horticulture (Odd years, Fa) Operation and management of greenhouses and other controlled environments used in horticultural production. Emphasis on system design and construction, control of light intensity and photoperiod, heating and cooling systems, substrates, mineral nutrition, water quality and irrigation systems. Prerequisite: HORT 2003 and CHEM 1074.

HORT4801L Floriculture Laboratory (Even years, Sp) Laboratory involving hands-on experiments designed to demonstrate principles discussed in the lecture section. Includes field trips. Corequisite: HORT 4803.

HORT4803 Floriculture (Even years, Sp) Principles and practices of production and marketing of containerized floricultural crops commonly produced in controlled environments including flowering containerized herbaceous species, geophytes and annual and perennial bedding plants. Prerequisite: HORT 4703.

HORT4903 Golf and Sports Turf Management (Odd years, Fa) Turf management techniques for golf courses, and athletic fields including species selection, root-zone construction and modification, fertilization, mowing, irrigation and pest control. Corequisite: Lab component. Prerequisite: CSES 2203 and CSES 2201L and (HORT 2303 or HORT 3403).

HORT4913 Rootzone Management for Golf and Sports Turf (Odd years, Sp) An overview of the fundamental concepts of the physical and chemical properties of rootzones as related to construction and turfgrass management. Prerequisite: HORT 2303.

HORT4921 Golf Course Operations (Even years, FA) This course is designed to cover specific aspects of golf course operations that would not be included in traditional turfgrass management courses. Topics will include budgeting, personnel management, tournament setup and operation, dealing with golf club committees, communication, and other relevant topics related to managing a golf course maintenance operation. Prerequisites: HORT 4903.

HORT5001 Seminar (Sp, Fa) Review of scientific literature and oral reports on current research in horticulture. May be repeated for 4 hours.

HORT503V Special Problems Research (Sp, Su, Fa) (1-6) Original investigations on assigned problems in horticulture. Prerequisite: graduate standing.

HORT5043 Advanced Plant Breeding (Odd years, Sp) Application of genetic principles to the improvement of crop plants. Presentation of conventional plant breeding methods and special techniques such as polyploidy, interspecific hybridization and induced mutation. Lecture 3 hours per week. Prerequisite: BIOL 3323 and BIOL 3321L (or ANSC 3123 and CSES 4103).

HORT5343 Seed Physiology (Irregular) Physiological process and molecular regulation in the development, dormancy, germination, and early growth of seeds. A basic knowledge of plant physiology expected. (Same as PTSC 5343)

HORT600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

HORT602V Special Topics in Horticulture (Irregular) (1-3) Discussion and advanced studies on selected topics in genetics, plant breeding, physiology and culture of horticultural crops. Prerequisite: graduate standing. May be repeated for 99 hours.

HORT6033 Genetic Techniques in Plant Breeding (Even years, Fa) Indepth study of genetic improvement and techniques. Covers both current and classical literature. Topics to be discussed: haploidy, genetic control of pairing, somatic instability, tissue culture and protoplast fusion, and male sterility. Lecture discussion 3 hours per week. Prerequisite: BIOL 3323 and BIOL 3321L (or ANSC 3123 and AGRN 4103 or equivalent).

PLANT SCIENCE (PTSC)

The doctoral program in Plant Science is an interdepartmental program involving the departments of Plant Pathology and Horticulture.

See page 149 for graduate courses in Plant Science.

HUMAN ENVIRONMENTAL SCIENCES, SCHOOL OF (HESC)

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- Professors Farmer, Martin, Warnock, Whan
- Associate Professors Bailey, Fitch-Hilgenberg, Gentry, Noble, Turner, Webb
- Assistant Professors Apple, Chi, Foote, Killian, Takigiku
- Instructors Baldwin, Crandall, Harding, Powell, Smith

Degree Conferred:

M.S. (HESC)

Areas of Concentration: Apparel studies; food, human nutrition and hospitality; human development and family sciences; and general human environmental sciences. (The Rural Sociology M.A. is awarded in the Sociology Department.)

Prerequisites to Degree Program: Applicants are expected to have sufficient undergraduate preparation to be admitted to the program. An admissions committee that is appointed by the Director at the time an application for admission is received determines eligibility for admission to any of the program areas. The admissions committee specifies any deficiencies in admission requirements that must be met by students who are admitted.

Prerequisites for the Concentration in Rural Sociology are found in the description of the Sociology program.

Requirements for the Master of Science Degree: The School requires that at least 50 percent of the course requirements be earned from courses at the 5000 or 6000 level. This degree allows for a thesis and non-thesis option. Students who have research assistantships funded by the Arkansas Agricultural Experiment Station are required to participate in the thesis option. The thesis option is also recommended for students who plan to continue their education beyond the Master of Science degree.

Thesis Option: The thesis option requires a minimum of 30 semester hours. Of those 30 hours, six semester hours of thesis research are required and at least 12 hours of course work must originate within the area of concentration. Students must also take at least one course each in graduate statistics and research methods.

Non-thesis Option: The non-thesis option requires a minimum of 33 semester hours of graduate level course work. A minimum of 15 of the semester hours must originate in the student's area of concentration. Students must also take at least one course each in graduate statistics and research methods. Non-thesis track students are required to pass both written and oral comprehensive exams.

HESC Distance Education Master's Degree: The General Human Environmental Sciences concentration is the only HESC M.S. degree available through distance education. The sequence of courses for distance education students is dependent upon the time of the student's enrollment and the availability of distance education courses offered by the school.

Human Environmental Sciences (HESC)

HESC400V Special Problems (Sp, Su, Fa) (1-6) May be repeated for 2 hours.
HESC4023 Advanced Apparel Merchandising (Sp, Fa) Advanced Apparel Merchandising aspects of fashion through interpretation of apparel classification, seasonal cycles, stock emphasis, assortment strategies, target customers, and apparel trends and an overview of marketing communication including advertising, personal selling and sales promotion. Prerequisite: HESC 3013 and HESC 3033 .
HESC4033 Advanced Textile Study (Sp) Use of advanced computer-aided-design (CAD) software to enhance skills in textile studies. Prerequisite: HESC 1053 and HESC 2053.
HESC4043 History of Apparel (Fa) The evolution of clothing from ancient times to the twentieth century with emphasis upon Western civilization. Cultural and economic factors affecting dress and customs associated with dress will be stressed. Lecture three hours per week. Prerequisite: ANTH 1023 or SOCI 2013 or HESC 1013.
HESC4053 Contemporary Apparel (Sp) Fashion as a social force, the origin, scope, theory, and history of the fashion business, the materials of fashion, the fashion producers, auxiliary fashion enterprises, designers, fashion leaders, and leading market. Lecture three hours per week. Prerequisite: HESC 3033 and HESC 4043.
HESC4063 Advanced Apparel Production (Sp, Fa) An advanced study of product development incorporating technology used in the industry for a career in fashion merchandising and/or product development. Prerequisite: HESC 3003 and HESC 2013.
HESC4103 Experimental Foods (Sp) Application of experimental methods for investigations in cookery. Group and individual problems. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: HESC 2112 and HESC 2111L and CHEM 1123 and CHEM 1121L (or HESC 2113 and CHEM 1074 and CHEM 1071L).
HESC4213 Advanced Nutrition (Fa) Normal nutrition with emphasis on utilization of nutrients. Lecture and reports on current literature 3 hours per week. Pre- or Corequisite: CHEM 3813. Prerequisite: HESC 3204.
HESC4243 Community Nutrition (Sp) Identifying, assessing, and developing solutions for nutritional problems encountered at the local, state, federal, and international levels. Lecture 3 hours per week. Prerequisite: HESC 1213.
HESC425V Food and Nutrition Seminar (Sp) (1-2) Upperclassmen, graduate students and members of faculty meet weekly for presentation and discussion of selected topics. Two credits (2 semesters) required of all foods and nutrition graduate students. May be repeated for 2 hours. Prerequisite: HESC 3204.
HESC4423 Adult Development (Fa) Examine individual development beginning with the transition adulthood through middle age; aproximate age ranges are 18-60 years. Content focuses on physical, cognitive, psychological, and social changes that occur throughout this period of the life span. The impact of love, work, and family on men's and women's movement through the transitions that comprise adulthood are emphasized. Prerequisite: HESC 1403 or PSYC 2003 and junior standing.
HESC4433 Dynamic Family Interaction (Sp) Examination of family interaction across the lifespan. Methods for enhancing marriage and family relations will be examined. Sources of marital conflict, intergenerational support and negotiations process will be analyzed. Lecture three hours per week. Prerequisite: HESC 2413 and junior standing.
HESC4443 Gerontology (Sp) Physiological and psychological development of the aging individual, extended family relations, service networks for the elderly, and retirement activities. Some attention to housing and care needs of persons in advanced years. Lecture 3 hours per week. Seminar. Prerequisite: HESC 1403 (or HESC 2413 or PSYC 2003 or SCWK 2133) and junior standing.
HESC4453 Parenting and Family Dynamics (Sp, Fa) Focus is on influence of parenting and family dynamics on individual development, especially factors in family life which contribute to normal psychological development. Topics include family values, the psychology of sex and pregnancy, the transition to parenthood, childbearing techniques, family influences on cognitive and social development, and changes in family relationships during the life cycle. Prerequisite: HESC 1403 or PSYC 2003.
HESC4463 Administration and Evaluation of Child Development (Fa) Programs Information on planning, developing, operating, and evaluating child development programs. Topics include physical facilities, staff, curriculum, budgets, parent involvement, and education. Lecture and discussion 3 hours per week. Prerequisite: HESC 3402 and HESC 3401L and junior standing.
HESC4493 Public Policy Advocacy for Children and Families (Fa) Public policy advocacy as related to children and family issues. Strategies for advocacy will be emphasized. Lecture three hours per week.
HESC455V Special Topics (Irregular) (1-6) Topics not covered in other courses, a focused study of specific topics in the students' areas of concentration. May be repeated for 6 hours.
HESC4613 Food Service Purchasing (Fa) Food purchasing with emphasis on specifications. Relationship of food purchasing to available equipment. Receiving, storage, distribution, and inventory control. Meal quality control and costing. Lecture 3 hours per week. Prerequisite: HESC 3653 and HESC 3604.
HESC4623 Selection and Layout of Food Service Equipment (Sp) Types of food service. Planning food flow from receiving to service of meals. Choosing proper equipment for the flow plan and service items. Sanitation, maintenance, comparison of personnel requirements. Lecture 3 hours per week. Prerequisite: HESC 3653 and HESC 3604.
HESC4633 Advanced Hotel Operations (SP) In-depth comprehensive study, strategic planning and analysis of the manager's role in successful hotel operations including application of specialized computer software and human resource management skills. Lecture 2 hours per week. Laboratory 3 hours per week. Prerequisite: HESC 3633
HESC4753 Family Financial Management (Fa) Economic considerations of the family in a rapidly changing society. Family finance and consumer problems are emphasized.
HESC4813 Human Factors in Interior Design (Sp) (Formerly HESC 3823). Emphasis is given to human behavior as applied to interior design. Types of interior spaces, environmental effects on behavior, ergonomics, interior design needs of special groups, and human factors programs are studied. Lecture 3 hours per week. Prerequisite: SOCI 2013 and PSYC 2003 and junior level standing.
HESC4903 Recent Advances in Manufacturing and Merchandising (Su) Study of the interaction between manufacturing, marketing, and merchandising in the apparel industry through classroom instruction and study tours. Includes study trip. Additional fees required. Lecture 3 hours per week and 1 week study tour. May be repeated for a maximum of 12 hours. May be repeated for 12 hours.
HESC5003 Advanced Apparel Studies in the Global Economy (Fa) Advanced analysis of economic, social and political aspects of the domestic and international textile and apparel industries.
HESC5013 Advanced Apparel Pattern Design (Sp) Use of computer aided design technology to perform pattern making techniques for apparel production. Laboratory 5 hours per week. Prerequisite: HESC 3003.
HESC502V Special Problems Research (Sp, Su, Fa) (1-6)
HESC5033 Principles of Textile Testing (Sp) Study of textile testing machines and methods utilized to determine construction and performance characteristics of woven and knit fabrics. Lecture 1 hour. Laboratory 4 hours per week. Corequisite: lab component.
HESC5203 Special Topics in Nutrition (Sp) Critical review of current literature; reports and discussion of original nutrition research pertinent to the topic(s) identified for study. Lecture/seminar format 3 hours per week. Prerequisite: HESC 4213 (or ANSC 3143) and CHEM 3813. May be repeated for 99 hours.
HESC5223 Nutrition During the Life Cycle (Fa) Study of normal nutrition emphasizing quantitative needs for nutrients as functions of biologic processes that vary during stages of the life cycle. Nutritive needs during pregnancy and childhood are emphasized with some attention tonourishing aging and elderly adults. Factors that affect food choices and eating behavior are also considered. Lecture 3 hours per week. Prerequisite: Graduate standing and consent of instructor. May be repeated.
HESC522V Readings in Nutrition (Sp) (1-6) Seminar and individual study. Prerequisite: HESC 4213 or HESC 4223 or ANSC 3143.
HESC5264 Medical Nutrition Therapy I (Fa) Principles of nutritional care with emphasis on pathophysiology, assessment and treatment in chronic illnesses. Lecture 3 hours, laboratory 3 hours per week. Prerequisite: Graduate standing and consent of instructor. May be repeated.
HESC5273 Medical Nutrition Therapy II (Sp) Principles of nutritional care with emphasis on pathophysiology, assessment and treatment in chronic illness. Lecture 3 hours per week. Prerequisite: HESC 5264. May be repeated.
HESC5403 Advanced Family Relations (Fa) Subtle elements in marriage, parent-child, and other relations among family members and between the family and the larger community. Recent cultural change as it affects the family. Recent research and literature. Prerequisite: graduate standing.
HESC5423 Theories of Human Development (Fa) Classic and contemporary theories and theoretical issues concerning human development across the life span. Prerequisite: graduate standing.
HESC5433 Advanced Child Development (Sp) Theory and research concerning normal behavior and development in childhood. Acquaintance with library resources, classic studies, and recent literature.
HESC5463 Research Methodology in Social Sciences (Sp) Logical structure and the method of science. Basic elements of research design; observation, measurement, analytic method, interpretation, verification, presentation of results. Applications to research in the economic and sociological problems of agriculture and Human Environmental Sciences. Prerequisite: graduate standing. (Same as AGEC 5013,AGED 5463,RSOC 5463)
HESC555V Special Topics in Human Environmental Sciences (Irregular) (1-3) Topics not covered in other courses or a more intensive study of specific topics in the specializations of human environmental sciences. May be repeated for 99 hours.
HESC5643 Meetings and Convention Management (Fa) Focuses on the planning and management of meetings and conventions in the hospitality industry. Prerequisites: HESC 1603 and HESC 2123.
HESC5653 Global Travel and Tourism Management (Fa) The course recounts the history of travel, explores the future, and discusses the components of tourism from a global perspective. Prerequisite: HESC 1603.
HESC600V Master's Thesis (Sp, Su, Fa) (1-6)
HESC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

FOOD SCIENCE (FDSC)

An interdepartmental doctoral program is available involving the Departments of Food Science, Animal, and Poultry Sciences, and Human Environmental Sciences leading to a doctoral degree in Food Science. *See page 105 for graduate courses in Food Science.*

RURAL SOCIOLOGY (RSOC)

See Sociology on page 163 for specialization in Rural Sociology, M.A. program.

Rural Sociology (RSOC)

RSOC4603 Environmental Sociology (Sp) The course provides a social perspective on environmental issues. It examines the linkage between society, ecological systems and the physical environment. It provides conceptual framework(s) for analyzing environmental issues, considers the role of humans in environmental issues, and enhances understanding the complexity of the relationship between societal organization and environmental change. (Same as SOCI 4603)

RSOC4623 Introduction to Community Development (Fa) Introduction to the field of community development; including approaches used in Cooperative Extension Service, vocational agriculture, local governments, and the private sector. Focus is on the community development process. Prerequisite: RSOC 2603 or SOCI 2013.
RSOC500V Special Problems (Sp, Su, Fa) (1-6) Gives experience in executing research and in analyzing a sociological problem of agriculture. Prerequisite: graduate standing. May be repeated for 6 hours.
RSOC5163 Agricultural and Rural Development (Su) First offered Summer 2001) Examination of agricultural and rural development issues in less developed countries. Alternative agricultural production systems are compared, development theories are examined, and consideration given to the planning and implementation of development programs. Corequisite: graduate standing and AGEC 1103 (or ECON 2023) (Same as AGEC 4163)
RSOC5463 Research Methodology in the Social Sciences (Odd years, Sp) Logical structure and the method of science. Basic elements of research design; observation, measurement, analytic method, interpretation, verification, and presentation of results. Applications to research in economic or sociological problems of agriculture and Human Environmental Sciences. Prerequisite: graduate standing. (Same as AGEC 5013,AGED 5463,HESC 5463)
RSOC600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
RSOC700V Doctoral Dissertation (Sp, Su, Fa) (1-9)

HUMANITIES (HUMN)

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Humanities (HUMN)

HUMN4043 Religion and Film (Sp) In Religion and Film we will critique films which explicitly and intelligently portray religious traditions, practices, and culture. In our viewing and our critical work we will face vicariously, but still viscerally, the questions of living religion in personal, social, and cultural contexts.

INDUSTRIAL ENGINEERING (INEG)

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- Distinguished Professor White
- Professors English, Johnson, Meller
- Associate Professors Cassady, Fant, Mason, Nachtmann, Pohl, Rossetti
- Adjunct Associate Professor Gattis
- Assistant Professors Buyurgan, Chimka, Nam

Degrees Conferred:

M.S.I.E. (INEG)
M.S.O.M. in Operations Management (OPMG) (See Operations Management)
M.S.O.R. in Operations Research (ORES) (See Operations Research)
M.S.E., Ph.D. in Engineering (ENGR) (See Engineering)

Areas of Research Activity: A critical component of all graduate-level work is scholarly activity through the completion of substantive research. These activities take place through the completion of doctoral dissertations, master's theses, and master's research projects. The department encourages the completion of master's theses, particularly for those students holding assistantship appointments.

Research areas of concentration at both the master's and doctoral levels include the following: artificial intelligence/expert systems, computer assisted processes, computer integrated manufacturing, financial engineering, engineering administration, facilities analysis/design, human factors/ergonomics, manufacturing automation/robotics, material handling, operations research, productivity measurement/analysis, production control/scheduling, and quality control/reliability.

Primary Areas of Faculty Research: Automation and robotics; economic decision analysis; electronics manufacturing; engineering and quality management; ergonomics, human factors and safety; manufacturing and transportation logistics; material handling and warehousing systems; operations research; quality, reliability, maintainability; and scheduling.

Prerequisites to the M.S.I.E. Degree Program:

1. There are no prerequisites for students with an undergraduate degree from an ABET-accredited industrial engineering program.
2. For students with a degree other than an ABET-accredited industrial engineering degree, a number of prerequisite courses are required. These are presented in a departmental manual for graduate students that should be obtained by all students entering programs at the graduate level. The graduate handbook is available online at the Industrial Engineering Web site listed above.

Requirements for the Master of Science in Industrial Engineering Degree: In addition to the requirements of the Graduate School, the following departmental requirements must be satisfied by candidates for the M.S.I.E. degree:

1. Candidates who present a thesis are required to complete a minimum of 24 graduate credit hours plus six hours of thesis.
2. Candidates who present a project are required to complete a minimum of 27 graduate credit hours plus three hours of INEG 513V Master's Research Project and Report.
3. Candidates who do not present either a thesis or project are required to complete 30 semester hours of course work.
4. Candidates must successfully complete a master's oral examination that is conducted by the candidate's committee.
5. Courses Taken for Graduate Credit: A limited number of 4000-level courses may be taken for graduate credit as specified by the department's Handbook for Advanced Degrees.
6. Attendance at INEG graduate seminar is required of all graduate students in Industrial Engineering.

Industrial Engineering (INEG)

INEG4223 Occupational Safety and Health Standards (FA) Survey of existing and proposed standards by examining fundamental physical, economic, and legal bases. Performance vs. specific standards. Enforceability and data collection. National consensus and promulgation process. Includes a computer-based design project. Prerequisite: PHYS 2054 or graduate standing. (Same as OMGT 4223)
INEG4233 Energy Conservation (Irregular) Elements of heat gain and heat loss in structures. Analysis and identification of energy loads in structures; heating load, lighting load, hot water load, distribution and equipment load, and cooling load. Identification and analysis of energy conservation measures. Economic analysis, life-cycle costing, payback period. Case studies and real structure analysis. Prerequisite: INEG 3413 and PHYS 2074.
INEG4323 Quality Engineering and Management (Sp) Provides the student with complete coverage of the functional area of "Quality Assurance" ranging from the need for such a function, how it works, techniques utilized, and managerial approaches for insuring its effectiveness. Prerequisite: senior standing.
INEG4423 Advanced Engineering Economy (Fa) Preparation of feasibility studies, including cost estimation, risk and uncertainty, sensitivity analysis and decision making. Effects of taxes, depreciation and financing costs on cash flows. Prerequisite: INEG 3413.
INEG4433 Systems Engineering and Management (Fa) Studies of cases in engineering administration emphasizing human relationships in a technical environment. Productivity/quality enhancement through an understanding of organizational design and behavior, motivation and reward systems, and participative management Prerequisite: Senior standing.

INEG4443 Project Management (Odd years, Sp) Analysis of the strategic level of engineering management including environment, planning, organization, and staffing. Professional creativity, motivation, leadership, and ethics are explored. At the tactical level, project selection, control and systems management are analyzed. Organizational behavior and models related to scientific and professional employees are examined. Prerequisite: senior standing.

INEG4453 Productivity Improvement (Even years, Sp) Analysis of common productivity problems. Development of skills required to diagnose problems; measure productivity; develop improvement strategies; and provide for the implementation and maintenance of productivity measurement and improvement systems. Prerequisite: senior standing.

INEG4513 Electronics Manufacturing Processes (Irregular) Introduction to manufacturing processes and concurrent engineering in the electronics industry. Survey of electronics components and products and the processes of fabrication and assembly. Principles of design, productivity, quality, and economics. Emphasis on manufacturability. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: ELEG 3903 (or ELEG 2103) and INEG 3313 (or STAT 3013). (Same as ELEG 4273)

INEG4523 Automated Production (Sp) Industrial robots and robot programming, industrial logic control systems, programmable controllers for the control of work stations, and conveyor systems. On-line computer control and microprocessors. Group technology, flexible manufacturing systems, and computer-integrated manufacturing. Laboratory required. Corequisite: Lab component. Prerequisite: INEG 2513 or graduate standing.

INEG4533 Application of Machine Vision (Sp) Automated machine vision applied to assembly and inspection tasks traditionally performed by human operators; development of application by acquiring image, processing image data, analyzing image and transmitting results; application analysis, selection and economics. Laboratory required. Corequisite: Lab component. Prerequisite: senior standing.

INEG4553 Production Planning and Control (Sp) Operational problems of production systems including a control of purchased materials inventory; scheduling a job shop, batch, and continuous production processes for single and multi-item product lines; planning of work force and inventory under seasonal and stochastic demand. Prerequisite or Corequisite: INEG 3613.

INEG4563 Application of Robotics (Fa) Industrial robotics, programming and applications; tooling and interfacing with peripheral equipment; sensor technology; machine vision; application analysis; selection and justification; research; economics; and human interface. Laboratory required. Corequisite: Lab component. Prerequisite: senior standing.

INEG4623 Introduction to Simulation (Fa) Elementary queuing models derivations and applications. Discrete simulation techniques. The SIMNET simulation language. Applications of simulation to the design of industrial and service installations. Simulation project. Prerequisite: ISYS 3393 or INEG 3833 or CSCE 1123. Pre or Corequisite: INEG 4333.

INEG4633 Transportation Logistics (Fa) Descriptive and analytical treatment of the critical design and modeling issues of the key transportation functions within the logistics system. Focus is on the storage and movement aspects of logistics in a firm.

INEG4723 Ergonomics (Sp, Fa) The capabilities and limitations of humans are addressed in the context of the person's interaction with machines and the environment. Topics of discussion include anthropometric considerations in equipment design, human sensory and physiological capabilities in the work environment, selection and training of workers, and the design of controls and displays. Corequisite: Lab component. Prerequisite: INEG 3713 and INEG 4333.

INEG4733 Industrial Ergonomics (Irregular) Gives background and experience in measurement and evaluation of human performance as it pertains to the working environment. The physical, physiological and psychological capabilities of the tasks they are to perform. Laboratory projects required. Prerequisite: INEG 4723 and INEG 4333.

INEG5111 Industrial Engineering Graduate Seminar (Sp, Fa) Papers presented by candidates for graduate degree in industrial engineering, graduate faculty, and guest lectures on design problems or new developments in the field of industrial engineering.

INEG5123 Industrial Engineering in the Service Sector (Irregular) Review of the development of industrial engineering into the service sector, e.g., health care systems, banking, municipal services, utilities, and postal service. Emphasizes those principles and methodologies applicable to the solutions of problems within the service industries. Prerequisite: graduate standing.

INEG513V Master's Research Project and Report (Sp, Su, Fa) (1-6) Required course for students electing the report option.

INEG514V Research and Special Topics (Sp, Su, Fa) (1-6) Fundamental and applied research. Prerequisite: graduate standing. May be repeated for 6 hours.

INEG5223 Safety and Health Standards Research (Irregular) For graduate students who seek Certified Professional or Certified Industrial Hygienist status, or both. Includes review and development of computer databases for standards, interpretations, court decisions, and field memoranda. Test equipment and procedures for determining indoor industrial aid containment PEL concentrations and industrial environment noise levels are examined. Prerequisite: INEG 4223 or OMGT 4303. (Same as OMGT 5223)

INEG5313 Engineering Applications of Probability Theory and Stochastic Processes (Irregular) Basic probability theory; random variables and stochastic processes; distribution of sums, products, and quotients of random variables, with application to engineering; normal and Poisson processes; engineering applications of Markov chains, ergodic theorem, and applications. Prerequisite: INEG 3313 and MATH 2574.

INEG5323 Reliability (Irregular) Reliability and maintenance techniques including probability modeling, statistical analysis, testing and improvement. Emphasis on engineering applications and computer analysis methods. Prerequisite: INEG 3313 or equivalent.

INEG5333 Design of Industrial Experiments (Sp) Statistical analysis as applied to problems and experiments in engineering and industrial research; experiment design and analysis; probability; and response surface analysis. Prerequisite: INEG 4333 or equivalent.

INEG5343 Advanced Quality Control Methods (Irregular) Acceptance sampling by attributes; single, double, sequential, and multiple sampling plans; sampling plans; sampling plans of Department of Defense; acceptance sampling by variables; Bayesian acceptance sampling; rectifying inspection for lot-by-lot sampling; control charts; special devices; and procedures. Prerequisite: INEG 3313.

INEG5353 Topical Readings in Quality Control (Irregular) Objectives of course: extend the student's quality background into some of the state-of-the-art process control techniques and related current and classical research topics in the area of quality control; vastly increase the student's knowledge of the industrial quality function; identify potential M.S., Ph.D, funded, and publishable research topics. Prerequisite: INEG 5343.

INEG5423 Engineering in Global Competition (Irregular) Studies of principles and cases in engineering administration in global competition. Emphasis on high-technology manufacturing such as the electronics industry. Survey of markets, technologies, multinational corporations, cultures, and customs. Discussions of ethics, professionalism, difference valuing, human relations skills, and other topics relevant to global engineering practice.

INEG5433 Cost Estimation Models (Even years, Fa) Overview of cost estimation techniques and methodologies applied to manufacturing and service organizations. Accomplished through detailed analysis of the cost estimation development process and various cost estimation models. Topics include data collection and management, learning curves, activity based costing, detailed and parametric estimation models, and handing risk and uncertainty. Prerequisite: INEG 4333.

INEG5443 Decision Models (Odd years, Fa) Focus on quantitative and qualitative decision models and techniques for technical and managerial problems. Emphasis on application and interpretation of results. Topics include decision trees, influence diagrams, weighting methods, value of information, Analytical Hierarchy Process, Bayes Theorem, Monte Carlo simulation, utility theory, risk analysis, group decision making and expert systems. Prerequisite: INEG 3413.

INEG5513 Advanced Materials Handling (Irregular) Computerized offline planning and on-line control of materials handling systems. Specific topics include programmable controls, graphic simulations, and information systems. Emphasis on projects. Prerequisite: INEG 4543 or graduate standing.

INEG5523 Topics in Automated Systems (Irregular) Current developments in applications of automation to industrial processes. Robots, expert systems, artificial intelligence, natural language interfaces, computer interfaces, and vision systems. Prerequisite: INEG 4523.

INEG5613 Optimization Theory I (Fa) Basic solutions and bases in linear equations, matrix version of simplex tableau, duality and primal dual relationships, complementary slackness, revised simplex, interior point algorithms and improving search strategies. Prerequisite: Graduate standing.

INEG5623 Analysis of Inventory Systems (Irregular) Elements of production and inventory control, economic lot size models, price breaks models using Lagrangian method, deterministic dynamic inventory model, probabilistic one-period and multi-period models, zero and positive lead time models, and continuous review models. Prerequisite: INEG 5313.

INEG5633 Integer Programming and Combinatorial Analysis (Irregular) Gomory's cutting plane algorithms for mixed and pure integer linear problems, Glover-Young primal-feasible algorithms, convergence proofs, branch and bound algorithms, Land-Doig algorithm, Dakin's algorithm, implicit enumeration, Balas zero-one algorithm, binary representation of integer problems, zero-one polynomial programming, the traveling salesman problem, quadratic assignment problem, and applications of integer programming. Prerequisite: INEG 5613 and MATH 3404.

INEG5643 Optimization Theory II (Irregular) Classical optimization theory, Lagrangian and Jacobian methods, Kuhn-Tucker theory and constraint qualification, duality in nonlinear problems; separable programming, quadratic programming, geometric programming, stochastic programming, steepest ascent method, convex combinations method, SUMT, Fibonacci search, and golden section method. Prerequisite: INEG 5613.

INEG5653 Modeling and Analysis of Semiconductor Manufacturing (Even years, Sp) Introduction to front end of semiconductor manufacturing process, wafer processing. Topics include an introduction to wafer processing, factory and equipment capacity modeling, automated material handling, simulation, cost modeling, and production scheduling. Prerequisite: INEG 3313.

INEG5663 Analysis of Queuing Systems (Irregular) Poisson axioms, pure birth and death model, queue disciplines (M/M/1) and (M/M/c) models, machine servicing model, Pollazek-Khintchine formula, priority queues, and queues in series. Markovian analysis of (GI/M/K) (M/G/1) models, and bulk queues. Reneging, balking, and jockeying phenomena. Transient behavior. Prerequisite: INEG 5313.

INEG5673 Graphs and Network Theory (Irregular) Directed, undirected and bipartite graphs; incidence matrices; shortest route problems; maximal flow and minimal cut theorems, planar graphs; and duality theorem. Applications of networks and graphs to transportation, transshipment, assignment, plant layout, routing, scheduling, and tree problems. Prerequisite: INEG 3613 or INEG 5613.

INEG5713 Advanced Topics in Human Factors Engineering (Irregular) Advanced work in special research topics in man-machine systems. Prerequisite: INEG 4723.

INEG5723 Advanced Man/Machine System Design (Irregular) Continuation of INEG 5713. Prerequisite: INEG 5713.

INEG5823 Systems Simulation I (Su) Monte Carlo technique, construction of digital simulation models, timekeeping in simulations, design of simulation experiment, and statistical verification of results. Includes the use of simulation language such as ARENA. Prerequisite: CENG 1913 and INEG 3313 (or equivalent).

INEG5843H Honors Scheduling & Sequencing I (Odd years, Sp) An introduction to constructive algorithms and various operations research approaches for solving sequencing and scheduling problems. The NP-completeness of most scheduling problems leads to a discussion of computational complexity, the use of heuristic solution methods, and the development of worst case bounds. Prerequisite: INEG 3613 and computer programming proficiency. (Same as INEG 5843)

INEG5843 Scheduling and Sequencing I (Odd Years, Sp) An introduction to constructive algorithms and various operations research approaches for solving sequencing and scheduling problems. The NP-completeness of most scheduling problems leads to a discussion of computational complexity, the use of heuristic solution methods, and the development of worst case bounds. Prerequisite: INEG 3613 and computer programming proficiency. (Same as INEG 5843H)

INEG600V Master's Thesis (Sp, Su, Fa) (1-9)

INEG6613 Operations Research Applications (Irregular) Investigation of literature case studies; use of mathematical models to solve practical problems; data collection and solution implementation. Students work in teams on actual problems observed in industry and government. Prerequisite: INEG 4623, INEG 5313 and INEG 5613.
INEG6823 Systems Simulation II (Irregular) Advanced topics in computer simulation including experimental design, simulation optimization, variance reduction, and statistical output analysis techniques applied to discrete event simulation. Prerequisite: INEG 4623.
INEG6843 Scheduling and Sequencing II (Odd years, Sp) An investigation into constructive algorithms and various operations research approaches for solving sequencing and scheduling problems in a variety of machine environments (single-machine, parallel machines, flow shops, and job shops). Prerequisite: INEG 5843.
INEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

INFORMATION SYSTEMS

See the Graduate School of Business, page 188.

JAPANESE

See Foreign Languages, page 107.

JOURNALISM, WALTER J. LEMKE DEPARTMENT OF (JOUR)

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- Professors Carpenter, Foley, Purvis, Wicks
- Associate Professors Jordan, Miller, Montgomery, Watkins
- Adjunct Associate Professor Rutherford
- Assistant Professor Fosu

Degree Conferred:

M.A. (JOUR)

Areas of Concentration: Advanced journalism studies, combined with graduate-level requirements in an additional academic discipline.

The purposes of the interdisciplinary program are to refine the skills of graduate journalism students through advanced writing courses in journalism and English; to offer comprehensive, media-related courses in government, public affairs, and law; and to provide journalists expertise in an additional academic discipline.

Prerequisites to Degree Program: A student with fewer than three years of professional journalism experience must possess an undergraduate degree, including a minimum of 21 undergraduate course hours in journalism and other courses specified by the Journalism Graduate Faculty Committee; a minimum undergraduate grade-point average of 3.00; and a minimum score of 1,000 on the verbal and quantitative parts of the Graduate Record Examinations (including a minimum score of 500 on the verbal part). A student with three or more years of professional journalism experience must possess an undergraduate degree and a minimum score of 1,000 on the verbal and quantitative parts of the Graduate Record Examinations (including a minimum score of 500 on the verbal part), or an undergraduate degree and a record of superior professional achievement.

Requirements for the Master of Arts Degree: In addition to the requirements of the Graduate School (page 36), the Master of Arts degree in Journalism requires a minimum of 30 semester hours with a cumulative grade-point average of 3.00. Students must complete:

1. 12 hours of graduate credit in journalism,
2. 12 hours of graduate credit in a single department other than journalism chosen by the student and approved by the Journalism Graduate Faculty Committee, and
3. a master's thesis (6 semester hours).

Journalism (JOUR)

JOUR4063 Computer-Assisted Publishing (Sp, Su, Fa) Indepth, hands-on exploration of computer hardware and software in the design and production of media messages. Examination of developing media technologies and the computer's influence on design and conceptualization.
JOUR4333 Ethics in Journalism (Sp) Critical examination of specific ethical problems confronting professionals in all areas of mass communications. Reading and writing assignments are aimed at familiarizing students with the nature of the mass media and their social responsibilities. Prerequisite: junior standing.
JOUR4503 Advanced Feature Writing (Fa) This course is designed for students with proven feature writing skills and basic training, to write a magazine-length, non-fiction, publishable-quality story on a timely subject that has connections to northwest Arkansas. Stories will be published in a student-managed forum. Prerequisite: JOUR 3123.
JOUR4883 Advanced Television News Production (Sp, Fa) Continuation of JOUR 4873. Students prepare and present television newscasts for air. Laboratory component arranged. Corequisite: Lab component. Prerequisite: JOUR 4873.
JOUR4903 Community Newspaper (Sp) This three-hour course will blend student' reporting and editing skills with instruction on how regional newspapers select and present news to a local audience. This course will instruct students in deciding news stories for regional readers, how those stories can best be written and displayed. The semester goal is to publish a paper. Prerequisite: junior standing.
JOUR5003 Advanced Reporting (Sp, Su, Fa) Stresses public affairs coverage, interpretive, investigative, and analytic journalism, involving research, work with documents, public records, and budgets and specialized reporting.
JOUR5033 Critical and Opinion Writing and Commentary (Sp, Su, Fa) Experience in writing and analyzing columns, editorials, criticism, and other forms of opinion and commentary in the media and in examining the media's role as a forum for opinion and commentary and its impact and influence.
JOUR5043 Research Methods in Journalism (Sp, Su, Fa) Research methods of utility in journalism. Emphasis on survey research, electronic data base searching, and traditional library research. Prerequisite: graduate standing or honors program standing. (Same as JOUR 5043H)
JOUR5063 Issues in Advertising and Public Relations (Fa) Seminar course involving the critical examination of the major cultural, social, political, economic, ethical, and persuasion theories and/or issues relevant to advertising and public relations affecting individuals, organizations, societies. Prerequisite: graduate standing.
JOUR5073 Propaganda and Public Opinion (Sp, Su, Fa) Examines and analyzes the means of influencing and measuring public opinion, with an emphasis on survey research and polling.
JOUR5183 International Mass Communications (Sp, Su, Fa) Examination of national media systems, issues in international communications, the role of the media in coverage of international affairs, and the impact of new technologies on mass communications.
JOUR5193 Professional Journalism Seminar (Irregular) Examination of complex problems encountered by professional journalists with focus on research and analysis of the role of journalism in major social, economic, and political developments. May be repeated twice for a maximum of 6 hours credit, as content will vary. May be repeated for 6 hours.
JOUR5233 Media and Public Policy (Sp, Su, Fa) Focuses on the interaction between media, politics, government, and public policy, particularly on the impact and influence of the media on the public policy agenda.
JOUR5313 Literature of Journalism (Sp, Su, Fa) A study of superior works of nonfiction journalism, past and present. Includes authors from Daniel Defoe to John McPhee.
JOUR5323 Documentary Production I (Fa) In-depth study of documentary film as non-fiction, long form journalism. Covers subject, funding, research and development, preproduction planning, field production, talent, music, post production, promotion, broadcast and distribution. Required trip to Hot Springs Documentary Film Festival.
JOUR5333 Documentary Production II (Sp) A continuation of JOUR 5323, Documentary Production I. Students photograph, write, and edit a documentary begun in the fall semester. Prerequisite: JOUR 5323.
JOUR600V Master's Thesis (Sp, Su, Fa) (1-6) Required of all M.A. journalism students.

KINESIOLOGY (KINS)

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Degrees Conferred:

M.S., Ph.D. (KINS)

Areas of Concentration for the Master of Science Degree: Adapted movement science, athletic training, and exercise science. Areas of specialization within the Exercise Science Concentration include biomechanics, exercise management, and exercise physiology.

Prerequisites to Degree Program: For acceptance to the master's degree programs the program area requires, in addition to the general requirements for admission to the Graduate School, an undergraduate degree in kinesiology or in a related field and the following admission standards: an overall undergraduate GPA of 3.00 or if the overall undergraduate GPA is between 2.70 and 2.99, the student must have a 3.00 GPA on the last 60 hours of undergraduate course work (excluding student teaching), or a GRE score of 1000 on the verbal and quantitative parts of the general test.

Requirements for the Master of Science Degree: Candidates for the M.S. degree in kinesiology with a concentration in either adapted movement science or exercise science must complete 27 semester hours of graduate work and a thesis or 33 semester hours without a thesis. The athletic training concentration requires 51 semester hours of graduate work and an independent research project or thesis. A graduate GPA of 3.0 or better is required for graduation. In addition, all degree candidates must successfully complete a written comprehensive examination.

Athletic Training Concentration: Presently, the athletic training education program has been granted candidacy status by the Joint Review Committee on Athletic Training Education and is seeking accreditation by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Candidacy status does not guarantee the program will receive accreditation status. In addition, candidacy and submission of the self-study do not guarantee accreditation. Students may have to make alternate plans in order to be eligible to sit for the NATABOC examination if accreditation is not achieved. See the Program Director for options. The student is offered the opportunity to interact with high quality researchers/teachers in the field of exercise science throughout the two and half years of course work, clinical rotations, and the research thesis, project or case study. Employment opportunities for graduates include serving as health care professionals for sports medicine clinics and hospitals. Other employment opportunities include professional teams as well as university, college, and secondary school athletic teams. This athletic training program is a pre-certification program in athletic training and is not intended for students who are already eligible to sit for the NATABOC examination. This is a full-time graduate program and requires considerable clinical experience as part of the requirements for graduation. This is a competitive concentration that requires admission to the HKRD department and the Graduate Athletic Training Education Program.

Deficiency/Prerequisite Courses for Admission to the Athletic Training Concentration: Students desiring admission to the athletic training education program must complete the following deficiency/prerequisite courses prior to admission: HESC 1213 Nutrition in Health, HLSC 1002 Wellness Concepts, KINS 2393 Prevention and Care of Athletic Injuries, KINS 3153 Exercise Physiology, KINS 3353 Mechanics of Human Movement, BIOL 2213/2211L Human Physiology and Lab, BIOL 2443/2441L Anatomy and Lab. If the above courses were obtained at a college/university other than the University of Arkansas, course syllabi/outlines for courses that are requested to meet the requirements must be submitted to the Program Director of Athletic Training Education for approval. It is imperative that students have the equivalent of the above undergraduate deficiencies/prerequisites to satisfy the competencies set forth by the National Athletic Trainers' Association Board of Certification. Students will be assigned to complete the above deficiency/prerequisite courses if no evidence of the above courses is presented.

Students who desire consideration for admission to the athletic training education program must submit the following information: 1) current CPR/First Aid Certification; 2) each student must provide evidence of a preprogram physical examination based on the University of Arkansas athletic training education program's technical standards by a board certified physician; 3) evidence of immunizations (mumps, measles, rubella, tetanus, and diphtheria); 4) Hepatitis B vaccination or waiver prior to beginning the clinical field base experience (the University of Arkansas Student Health Center offers the Hepatitis B vaccination for $120.00 for all three shots); 5) a current tuberculosis screening test; 6) a minimum of 50 hours of observation under the direct supervision of a NATABOC certified athletic trainer; 7) three professional letters of recommendation; 8) completion of the University of Arkansas Graduate School Application (because of national accreditation standards/guidelines, admission into the athletic training education program is selective, and therefore, admission to the Graduate School of the University of Arkansas does not guarantee admission into the Athletic Training Education Program); 9) completion of Athletic Training Education Program Application (see athletic training Web site http://uark.edu/depts/atepweb/; 10) an official copy of all transcripts; and 11) all prospective students must satisfy required athletic training technical standards that are listed below.

Athletic Training Education Technical Standards: Because the Master of Science degree in Kinesiology with a concentration in Athletic Training and NATABOC certification signifies that the holder is a clinician prepared for entry into the practice of athletic training within a variety of employment and education settings, it follows that graduates must have the knowledge and skills to function in a broad variety of clinical situations and to render a wide spectrum of patient care. Therefore, the students must meet technical standards before being admitted to the Athletic Training Education Program. The technical standards set forth by the Athletic Training Educational Program establish the essential qualities considered necessary for students admitted to this program to achieve the knowledge, skills, and competencies of an entry-level athletic trainer, as well as meet the expectations of the program's accrediting agency (Commission on Accreditation of Allied Health Education Programs (CAA-HEP)). Applicants who may not meet these technical standards are encouraged to contact the Program Director of Athletic Training Education, 308H HPER Building, University of Arkansas. The following are the technical standards:

1. Candidates must be able to actively learn from observations, demonstrations, and experiments in the basic sciences.
2. Candidates must be able to learn to analyze, synthesize, solve problems, and reach assessment and therapeutic judgments distinguished from the norm.
3. Candidates must have sufficient sensory function and coordination to perform appropriate physical examinations using acceptable techniques.
4. Candidates must be able to relate effectively to athletes and the physically active and to establish sensitive, professional relationships with them.
5. Candidates are expected to be able to communicate the results of the assessment to the injured or ill exerciser, to responsible

officials, to parents or guardians, and to colleagues with accuracy, clarity, and efficiency.
6. Candidates are expected to learn and perform routine prevention, assessment, emergency care, and therapeutic procedures.
7. Candidates are expected to be able to display good judgment in the assessment and treatment of injured or ill athletes and physically active individuals.
8. Candidates must be able to learn to respond with precise, quick, and appropriate action in emergency situations.
9. Candidates are expected to be able to accept criticism and respond by appropriate modification of behavior.
10. Candidates are expected to possess the perseverance, diligence, and consistency to complete the athletic training degree curriculum as outlined and sequenced, to attempt NATABOC certification within the year of program completion, and to enter the practice of athletic training.

Prospective students are required to consult the athletic training Web site: http://www.uark.edu/depts/atepweb/ for information concerning application procedures and specific policies and procedures of the athletic training education program. Following the deadline for application acceptance, the athletic training selection committee, which is comprised of the three athletic training faculty, an exercise science faculty member, HKRD graduate coordinator, and the head athletic trainers from both Men's and Women's Athletics, will evaluate and rate each applicant. This rating is determined by a 5 point Likert scale and written verbal comments in the areas of GPA, work experience, letters of recommendation, and writing ability (essay requirement). Once a determination has been rendered concerning the applicant's desire for admission, a formal letter noting acceptance, denial, or placement on a wait-list will be sent to the applicant. The University of Arkansas Graduate School transfer of credit policy will apply if a student desires to transfer credit hours from another institution into the athletic training education program (see transfer credit policy for the Master of Science Degree Program located in the Graduate Catalog).

Adapted Movement Science Concentration: (33 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (15)
- PHED 5413 Adapted Physical Education
- KINS 5423 Assessment and Prescriptive Programming in Adapted KINS
- KINS 5443 Perceptual Motor Development and Clinical Application
- KINS 5513 Physiology Exercise I
- CIED 5723 Nature and Needs of Persons with Mild Disabilities

Required Project or Thesis (3-6)
- KINS 589V Independent Research (master's degree project), or KINS 600V Master's Thesis

Approved Electives (6-9)

Athletic Training Concentration: (51-54 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (42)
- KINS 5212 Ath Train Clin I-App of Ath Injury Prev Devises
- KINS 5222 Ath Train Clin II-Evaluation Lab Lower
- KINS 5232 Ath Train Clin III-Evaluation Lab Upper
- KINS 5242 Ath Train Clin IV-Emergency Procedure
- KINS 5252 Ath Train Clin V-Rehab Lab
- KINS 5262 Ath Train Clin VI-Ath. Training Sem.
- KINS 5323 Biomechanics I
- KINS 5363 Eval Tech of Ath Injury-Upper Extremity
- KINS 5373 Eval Tech of Ath Injury-Lower Extremity
- KINS 5453 Ther Modalities in Ath Train
- KINS 5463 Ther Exercise and Rehab of Ath Injury
- KINS 5473 Admin in Ath Train
- KINS 5483 Medical Conditions in Ath Train
- KINS 5513 Physiology Exercise I
- KINS 5593 Practicum in Lab Instrumentation
- KINS 5773 Performance and Drugs

Required Project or Thesis (3-6)
- KINS 589V Independent Research (masters's degree project), or KINS 600V Master's Thesis

Exercise Science Concentration: (33 hours)
Required Research Component (6)
- EDFD 5393 Statistics in Education and Health Professions, or EDFD 6403 Educational Statistics and Data Processing
- HKRD 5353 Research in HKRD

Required Courses (9)
- KINS 5513 Physiology Exercise I
- KINS 5323 Biomechanics I
- KINS 5593 Practicum in Lab Instrumentation

Required Project or Thesis (3-6)
- KINS 589V Independent Research (master's degree project), or KINS 600V Master's Thesis

Approved Electives (12-15)

Areas of Concentration for the Doctor of Philosophy Degree: Pedagogy and exercise science.

Prerequisites to Ph.D. Degree Program: The applicant must have completed a master's degree or its equivalent in kinesiology or a closely related field and meet general admission requirements of the Graduate School. An application should include identification of the applicant's objectives, supportive background information, including three letters of recommendation supporting the applicant's ability to successfully pursue a Ph.D. in kinesiology, a GPA of at least 3.00 on all graduate course work, and an acceptable score on the Graduate Record Examinations (GRE). Additional prerequisites may be prescribed after review of application materials. Furthermore, applicants who present a GRE score of 1200 or greater on the combined verbal/quantitative portions, a GRE writing score of 5.5 or greater, an overall GPA of 3.85 or higher, and faculty approval may apply for admission to the Ph.D. Kinesiology program after completion of their bachelor's degree.

Requirements for the Doctor of Philosophy Degree: A minimum of 96 graduate credit hours beyond the baccalaureate is required for the degree. A doctoral advisory committee will be established by the student in consultation with the Coordinator of Graduate Study during the first semester of enrollment subsequent to acceptance into the degree program. If competency cannot be determined, successful completion of a preliminary examination may be required of the student prior to the completion of 48 hours of graduate course work beyond the bachelor's degree or as soon after admission to the doctoral degree program as possible. The degree program also requires successful completion of candidacy examinations, an acceptable doctoral dissertation, and oral defense of the dissertation. These last requirements are described elsewhere in this catalog. Further requirements for the Doctor of Philosophy degree in Kinesiology include the following:

Exercise Science Concentration:

Departmental Core Requirements
Required Prerequisites: (12)
HKRD 5353 Research in HKRD
KINS 5323 Biomechanics I
KINS 5513 Physiology of Exercise I
KINS 5593 Practicum in Laboratory Instrumentation
Required Courses: (6)
KINS 6323 Biomechanics II
KINS 6343 Physiology of Exercise II
Research and Statistical Requirements: (18)
(A minimum of 18 hours approved by doctoral advisory committee.)
Field of Study: (18)

The student, in consultation with the doctoral advisory committee, will identify further course work comprising a field of study in kinesiology and consistent with the goals and objectives of the student and institution. Course work may be selected from several related disciplines or a single discipline.

Dissertation: (18)

Pedagogy Concentration:
Departmental Core Requirements
Required Prerequisites: (6)
PHED 5233 Research in Teaching Physical Education
HKRD 5353 Research in HKRD
Required Courses: (12)
PHED 6353 Systematic Observation Research in Physical Education
PHED 6363 Supervision in Physical Education
KINS 674V Internship: College Teaching
HKRD 689V Directed Research
Research and Statistical Requirements: (18) (A minimum of 18 hours approved by the doctoral advisory committee)
Cognate: (6)
(A minimum of 6 hours approved by doctoral advisory committee.)
Field of Study: (12)
The student, in consultation with the doctoral advisory committee, will identify further course work comprising a field of study in kinesiology and consistent with the goals and objectives of the student and institution. Course work may be selected from several related disciplines or a single discipline.
Dissertation: (18)

Through an agreement with the Academic common market, residents of certain Southern states may qualify for graduate enrollment in the masters or doctoral program in kinesiology.

Kinesiology (KINS)

KINS5212 Athletic Training Clinical I - Application of Athletic Preventive Devices (Su) This course will serve as an introduction to the athletic training clinical program. Procedures and policies of thte clinical program and application of athletic preventive devices will be included as well. Prerequisite: admission to the graduate program in athletic training.
KINS5222 Athletic Training Clinical II - Evaluation Lab - Lower Extremity (Fa) This course will serve as a process for monitoring student's progression of athletic training proficiencies, acquire clinical hours under the direct supervision of a certified athletic trainer, and reinforce the evaluation skills of gait, lower extremity, and spine/pelvis. Prerequisite: KINS 5212.
KINS5232 Athletic Training Clinical III - Evaluation - Upper Extremity (Sp) This course will serve as a process for monitoring student's progression of athletic training competencies, acquire clinical hours under the direct supervision of a certified athletic trainer, and reinforce the evaluation skills of the upper extremities, head, neck, and posture. Prerequisite: KINS 5222.
KINS5242 Athletic Training Clinical IV - Emergency Procedures/Modality Lab (Su) This course will serve as a process for monitoring student's progression of athletic training competencies, acquire clinical hours under the direct supervision of a certified athletic trainer, and reinforce and instruct new emergency procedures and serve as a lab for therapeutic modalities. Prerequisite: KINS 5232.
KINS5252 Athletic Training Clinical V - Rehabilitation Lab (Fa) This course will serve as a process for monitoring student's progression of athletic training competencies, acquire clinical hours under the direct supervision of a certified athletic trainer, and reinforce techniques and applications of therapeutic exercise and rehabilitation. Prerequisite: KINS 5242
KINS5262 Athletic Training Clinical VI - Athletic Training Seminar (Sp) This course will serve as a process for monitoring student's progression of athletic training competencies, acquire clinical hours under the direct supervision of a certified athletic trainer, and serve as a capstone course validating the athletic training clinical proficiencies and prepare students for the NATABOC certification exam and future employment. Prerequisite: KINS 5252.
KINS5323 Biomechanics I (Fa) Intended to serve as in introduction to biomechanics and focuses on scientific principles involved in understanding and analyzing human motion.
KINS5333 Instrumentation in Biomechanics (Irregular) The application of knowledge and skills necessary for data collection for sports analysis. Provides valuable information on instrumentation used specifically in biomechanics. Prerequisite: KINS 5323.
KINS5363 Evaluation Techniques of Athletic Injuries - Upper Extremity (Sp) Use of scientific assessment methods to recognize and evaluate the nature and severity of athletic injuries to the upper extremities, trunk, and head. Prerequisite: admission to graduate athletic training program.
KINS5373 Evaluation Techniques of Athletic Injuries - Lower Extremity (Fa) Use of scientific assessment methods to recognize and evaluate the nature and severity of athletic injuries to the hip and lower extremities. Prerequisite: admission to graduate athletic training program.
KINS5423 Assessment and Prescriptive Programming in Adapted KINS (Sp) Instruction in the assessment, prescription, and use of instruction methods, materials, and equipment relevant to specific handicapping conditions in the adapted physical education setting.
KINS5443 Perceptual-Motor Development and Clinical Application (Irregular) In-depth examination relevant to specific handicapping conditions in the adapted physical education setting.
KINS5453 Therapeutic Modalities in Athletic Training (Su) Contemporary therapeutic modalities used in managing athletic injuries. Modalities covered are classified as thermal agents, electrical agents, or mechanical agents. Emphasis is placed on their physiological effects, therapeutic indications (and contraindications), and clinical application. Prerequisite: admission to graduate athletic training program.
KINS5463 Therapeutic Exercise and Rehabilitation of Athletic Injuries (Fa) A systematic approach to exercise program development, techniques, indications and contraindications of exercise, and progression as related to athletic injury, prevention, and return to play guidelines. Prerequisite: admission to graduate athletic training program.
KINS5473 Administration in Athletic Training (Su) Administrative components of athletic training. Basic concepts of legal liability, leadership and management principles, financial management, day to day scheduling and supervision, maintenance, and general administration. Prerequisite: admission to graduate athletic training program.
KINS5483 Medical Conditions in Athletic Training (Fa) This course will provide a collection of knowledge, skills, and values that the entry-level certified athletic trainer must possess to recognize, treat, and refer, when appropriate, the general medical conditions and disabilities of athletes and others involved in physical activity. Prerequisite: admission to the graduate athletic training program or permission of instructor.
KINS5493 Practicum in Adapted Physical Education (Irregular) Deals with the application of skills, knowledge and concepts necessary for planning, organizing and conducting adapted physical education programs through supervised field experiences.
KINS5513 Physiology Exercise I (Fa) A study of the foundation literature in exercise physiology. Emphasis is placed on the muscular, cardiovascular, and respiratory systems.
KINS5523 Muscle Metabolism in Exercise (Even Years, Sp) A study of the metabolic changes that occur in muscle as a result of exercise, exercise training, and other stressors. Prerequisite: KINS 5513 or equivalent.
KINS5533 Cardiac Rehabilitation Program (Sp) An examination of the concepts, design, and implementation of cardiac rehabilitation programs. Emphasis on exercise programs but reference to nutrition, psychology, and other lifestyle interventions.
KINS5543 Cardiovascular Function in Exercise (Odd Years, Sp) Study of the effects of exercise training and other stressors on the cardiovascular system. Detailed study of the components of the cardiovascular system and the responses and adaptations of those components to selected stimuli. Prerequisite: KINS 5513 or equivalent.
KINS5593 Practicum in Laboratory Instrumentation (Su, Fa) Practical experience in testing physical fitness utilizing laboratory equipment. Objective is to quantify physiological parameters, leading to the individualized exercise prescription.
KINS560V Workshop (Irregular) (1-3) May be repeated for 3 hours.
KINS5643 Motor Learning (Sp) Concepts of motor learning and control are presented. Attention is given to an analysis of the literature in movement control, motor behavior, and motor learning.
KINS574V Internship (Sp) (1-6) May be repeated for 6 hours.
KINS5753 Research in Sport Psychology (Su) Investigation of historical and contemporary research in sport psychology. Prerequisite: HKRD 5353.
KINS5773 Performance and Drugs (Irregular) The pharmacological and physiological effects of ergogenic aids upon the athlete and performance coupled with the ethical and moralistic viewpoints of drug taking. Practical laboratory experiences are provided with pertinent statistical surveys of athletes; their drug taking habits and relevant psychological impact on performance. Prerequisite: BIOL 2213 and BIOL 2211L or equivalent.
KINS589V Independent Research (Sp, Su, Fa) (1-3) Development, implementation, and completion of basic or applied research project. Prerequisite: M.S. degree program in exercise and movement sciences and HKRD 5353 and EDFD 5393.
KINS599V Seminar (Irregular) (1-6)
KINS600V Master's Thesis (Sp, Su, Fa) (1-6)
KINS605V Independent Study (Sp, Su, Fa) (1-3) Provides students with an oppor-

tunity to pursue special study of educational problems. May be repeated for 3 hours.
KINS6323 Biomechanics II (Irregular) Analysis of human movement with emphasis on sports skills by application of principles of anatomy, kinesiology, and cinematographical analysis. Prerequisite: KINS 5323.
KINS6343 Physiology of Exercise II (Irregular) Detailed study of the body systems affected by exercise, the functions of these systems during exercise, the effects of age, sex, body type, and nutrition on capacity for exercise, the techniques of assessing work capacity, and a critical analysis of research literature in this area.
KINS660V Workshop (Irregular) (1-6)
KINS674V Internship (Irregular) (1-3) May be repeated for 3 hours.
KINS699V Seminar (Irregular) (1-3) May be repeated for 3 hours.

MANAGEMENT (MGMT)

See Graduate School of Business, page 189.

MARKETING AND LOGISTICS (MKTL)

See Graduate School of Business, page 190.

MATHEMATICAL SCIENCES, DEPARTMENT OF (MASC)

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- Distinguished Professors Khavinson, Schein
- Professors Akeroyd, Brewer, Cochran, Feldman, Goodman-Strauss, Luecking, Madison, Ryan
- Associate Professors Arnold, Capogna, DeOliveira, Hogan, Johnson, Lanzani, Meaux, Meek, Petris
- Assistant Professors Chan, Rieck, Song
- Instructor Woodland

Degrees Conferred:

M.S. (MATH)
Ph.D. (MATH) with concentrations in Mathematics and Statistics
M.A. in Secondary Mathematics (SMTH)
M.S. in Statistics (STAT) (See Statistics)

Primary Areas of Faculty Research: Analysis, algebra, geometric topology, numerical analysis, statistics.

Prerequisites to Degree Program: Prospective candidates for the Master of Science degree in Mathematics are expected to have completed a program equivalent to that required by the department for a B.S. degree, as set forth in the current catalog of the Fulbright College of Arts and Sciences. Deficiencies may be removed either by taking the appropriate undergraduate courses or by examination.

The degree of Master of Science is intended for collegiate teachers of mathematics, non-teaching professional mathematicians, and those who desire to continue advanced study.

Requirements for the Master of Science Degree: This degree is offered under two separate options, a general option and a computational mathematics option. The general option is intended for students who plan to be collegiate teachers of mathematics, continue advanced study in mathematics, or obtain a broad background for preparation as a non-teaching professional mathematician. The computational mathematics option is intended for students who intend to specialize in computational and applied mathematics in preparation for professional employment in an interdisciplinary or computationally intensive environment.

The program of a candidate will be determined in conference with the candidate's graduate adviser. A comprehensive examination must be passed by each candidate for the Master of Science degree. It should be taken near the end of the last semester of residence. At least four weeks prior to the scheduled date, students must notify the department of their intention to take the examination. No student may take the comprehensive examination more than three times. MATH 5013, MATH 5033, and MATH 504V are not applicable to the Master of Science degree in mathematics. The program will include at least two semesters of one-hour credit in MATH 510V Mathematics Seminar.

The candidate for the general option must complete a minimum of 32 semester hours of approved graduate work. Students may include up to nine semester hours of graduate work in courses outside the department. All selected courses are subject to the approval of the Graduate Committee. The comprehensive examination for the general option will include material covered in six semester hours of graduate courses in each of 1) abstract algebra, 2) topology, 3) real or complex analysis, and 4) an area chosen by the candidate and approved by the Graduate Committee. When there is a choice in the above list of topics, students shall make their choice not less than four weeks before the date of the examination.

The candidate for the computational mathematics option must complete a minimum of 32 semester hours of approved graduate work. Students must include at least six but not more than twelve semester hours of graduate work in courses outside of mathematics. All selected courses are subject to the approval of the Graduate Committee. The comprehensive examination for the computational mathematics option will include material covered in six semester hours of graduate courses in each of 1) numerical analysis, 2) applied mathematics, 3) analysis, algebra, or topology, and 4) an area other than mathematics chosen by the student and approved by the Graduate Committee.

Requirements for the Master of Arts Degree with a Major in Secondary Mathematics: This program is designed for secondary school teachers of mathematics. It requires 32 semester hours of graduate work.

Prospective candidates for the Master of Arts degree in secondary mathematics are expected to have earned credit in courses equivalent to MATH 2574, MATH 3083, MATH 3113, and MATH 3773. Deficiencies may be removed either by taking the appropriate courses or by examination.

The candidate's program must include MATH 4513, MATH 5123, two semesters of one hour credit in MATH 510V, and one of the following courses: MATH 5133, MATH 5303, MATH 5313, MATH 5503, MATH 5523, or MATH 5703. Not more than 12 semester hours of credit toward this degree will be allowed from graduate courses in education. All courses selected to apply on this degree must be approved by the student's adviser in accordance with the above requirements. Recommended courses include MATH 4103, MATH 4253, MATH 4353, MATH 4363, MATH 4523, and either STAT 3013 or STAT 5103.

Each person receiving the Master of Arts degree in secondary mathematics must pass a written examination covering 1) algebra, MATH 5123, 2) advanced calculus, MATH 4513, 3) geometry, and one other area of mathematics to be approved by the candidate's adviser. The examination schedule is the same as for the Master of Science degree. No student will be allowed to take the examination more than three times.

Requirements for the Doctor of Philosophy Degree: Candidates for the degree of Doctor of Philosophy with a major in mathematics will be required to earn not less than 60 semester hours of course credit beyond the bachelor's degree in mathematics and closely related fields.

The number of hours and the courses for each student will be determined by the advisory committee. The candidate must fulfill the course requirements for the Master of Science degree in mathematics.

The basic requirement for the Ph.D. degree is the preparation of an acceptable dissertation. This dissertation must demonstrate the candidate's ability to do independent, original, and significant work in mathematics. It is required that this dissertation possess the degree of excellence of research papers ordinarily published in the leading mathematical journals.

A comprehensive examination is given each year during the weeks preceding the beginning of the fall and spring semesters. This examination is taken by all students in the graduate program who have completed the requirements for the M.S. degree and who have not been admitted to candidacy for the Ph.D. degree. The examination serves as both a qualifying and candidacy examination. The prospective candidate for the Ph.D. will be allowed to take the examination at most three times. Two failures to qualify eliminates a student from the graduate program in mathematics.

In addition to extending knowledge by personal reading and research, a doctoral graduate in mathematics will normally communicate knowledge to others. Therefore each student in the Ph.D. program is required to acquire the equivalent of one semester of full-time experience in teaching; this requirement may be fulfilled by part-time experience over several semesters. Typically, teaching assistantship appointments will satisfy this requirement, but other similar experience may qualify as approved by the department.

Mathematics (MATH)

MATH4103 Finite Dimensional Vector Spaces (Irregular) Linear functionals, matrix representation of linear transformations, scalar product, and spectral representation of linear transformations. Prerequisite: MATH 3083.
MATH4113 Introduction to Abstract Algebra II (Fa) Topics in abstract algebra including finite abelian groups, linear groups, factorization in cummutative rings, quadratic field extensions, Gaussian integers, Wedderburn's theorem, and multilinear algebra. Prerequisite: MATH 3113.
MATH4153 Mathematical Modeling (Fa) Mathematical techniques for formulating, analyzing, and criticizing deterministic models taken from the biological, social, and physical sciences. Techniques include graphical methods, stability, optimization, and phase plane analysis. Prerequisite: MATH 3404.
MATH4203 Linear Programming and Game Theory (Irregular) Solution sets, duality, and pivoting in linear programming; feasible solutions and the simplex method; the transportation problem; and matrix games. Prerequisite: MATH 3083 and proficiency in a high-level computer language.
MATH4253 Symbolic Logic I (Fa) Rigorous analyses of the concepts of proof, consistency, equivalence, validity, implication, and truth. Full coverage of truth-functional logic and quantification theory (predicate calculus). Discussion of the nature and limits of mechanical procedures (algorithms) for proving theorems in logic and mathematics. Informal accounts of the basic facts about infinite sets. (Same as PHIL 4253)
MATH4263 Symbolic Logic II (Sp) Topics include: soundness and completeness of propositional logic, soundness and completeness of quantification theory, the elements of model theory and recursion theory, G˝del's incompleteness theorems, and the limitative theorems of Tarski and Church. Prerequisite: MATH 4253 or PHIL 4253. (Same as PHIL 4263)
MATH4353 Numerical Linear Algebra (Sp) Numerical methods for problems of linear algebra, including the solution of very large systems, eigenvalues, and eigenvectors. Prerequisite: MATH 3083.
MATH4363 Numerical Analysis (Fa) General iterative techniques, error analysis, root finding, interpolation, approximation, numerical integration, and numerical solution of differential equations. Prerequisite: MATH 4513.
MATH4443 Complex Variable for Application (Sp) Complex analysis, series, and conformal mapping. Additional applications for graduate credit. Prerequisite: MATH 3404.
MATH4503 Differential Geometry and Vector Calculus (Irregular) Topics include: Vector differential and integral calculus, Stokes' Theorem in 3-space, classical differential geometry in 3-space (curves, surfaces), differential forms, general Stokes' Theorem, applications to hydrodynamics, and electromagnetism. Prerequisite: MATH 3083 and MATH 4513.
MATH4513 Advanced Calculus I (Fa) The real and complex number systems, basic set theory and topology, sequences and series, continuity, differentiation, and Taylor's theorem. Emphasis is placed on careful mathematical reasoning. Prerequisite: MATH 2574 and MATH 3083.
MATH4523 Advanced Calculus II (Sp) The Riemann-Stieltjes integral, uniform convergence of functions, Fourier series, implicit function theorem, Jacobians, and derivatives of higher order. Prerequisite: MATH 4513.
MATH5013 Topics in Algebra for Teachers (Irregular) Topics from abstract and linear algebra of current interest to teachers. Prerequisite: graduate standing. May be repeated for 99 hours.
MATH5033 Topics in Analysis for Teachers (Irregular) Topics related to calculus of current interest to secondary school teachers. Prerequisite: graduate standing. May be repeated for 99 hours.
MATH504V Special Topics for Teachers (Irregular) (1-6) Current topics in mathematics of interest to secondary school teachers. Prerequisite: graduate standing. May be repeated for 99 hours.
MATH510V Mathematical Seminar (Fa) (1-3) Members of the faculty and advanced students meet for presentation and discussion of topics. Prerequisite: graduate standing.
MATH5123 Algebra I (Sp) What the beginning graduate student should know about algebra: groups, rings, fields, modules, algebras, categories, homological algebra, and Galois Theory. Prerequisite: MATH 3113.
MATH5133 Algebra II (Fa) Continuation of 5123. Prerequisite: MATH 5123.
MATH5303 Ordinary Differential Equations (Fa) Existence, uniqueness, stability, qualitative behavior, and numerical solutions. Prerequisite: MATH 3404 and MATH 4513 and programming experience.
MATH5313 Partial Differential Equations (Sp) Classification, boundary value problems, applications, and numerical solutions. Prerequisite: MATH 3423 and MATH 4513.
MATH5363 Scientific Computation and Numerical Methods (FA) An introduction to numerical methods used in solving various problems in engineering and the sciences. May not earn credit for this course and MATH 4353 or MATH 4363. (Same as PHYS 5363)
MATH5453 Functional Analysis I (Odd years, Sp) Linear vector spaces and linear operators. Prerequisite: MATH 5513.
MATH5503 Theory of Functions of a Real Variable I (Fa) Real number system, Lebesque measure, Lebesque integral, convergence theorems, differentiation of monotone functions, absolute continuity and the fundamental theorem of calculus L^P spaces, Holder and Minkowski inequalities, and bounded linear functionals on the L^P spaces. Prerequisite: MATH 4523.
MATH5513 Theory of Functions of a Real Variable II (Sp) Measure and integration on abstract measure spaces, signed measures, Hahn decomposition, Radon-Nikdoym theorem, Lebesque decomposition, measures on algebras and their extensions, product measures, and Fubini's theorem. Prerequisite: MATH 5503.
MATH5523 Theory of Functions of a Complex Variable I (Fa) Complex numbers, analytic functions, power series, complex integration, Cauchy's Theorem and integral formula, maximum principle, singularities, Laurent series, and Mibius maps. Prerequisite: MATH 4513.
MATH5533 Theory of Functions of a Complex Variable II (Sp) Riemann Mapping Theorem, analytic continuation, harmonic functions, and entire functions. Prerequisite: MATH 5523.
MATH5703 Foundations of Topology (Fa) Metric and general topological spaces, separation axioms, Urysohn's lemma, Tietze extension theorem, connectedness, compactness, and the Tychonoff theorem. Prerequisite: MATH 4513.
MATH5713 Algebraic Topology (Fa) Homotopy, singular and relative homology, excision theorem, the Mayer-Vietoris sequence, Beti numbers, and the Euler characteristic. Prerequisite: MATH 5703.
MATH600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
MATH610V Directed Readings (Irregular) (1-6)
MATH619V Topics in Algebra (Sp, Su, Fa) (1-6) Current research interests in algebra. May be repeated for 99 hours.
MATH659V Topics in Analysis (Sp, Su, Fa) (1-6) Current research interests in analysis. May be repeated for 99 hours.
MATH679V Topics in Topology (Sp, Su, Fa) (1-6) Current research interest in topology. May be repeated for 99 hours.
MATH700V Doctoral Dissertation (Sp, Su, Fa) (1-6)

MECHANICAL ENGINEERING (MEEG)

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- Distinguished Professor Saxena
- Giffels Professor Bhat
- Professors Jong, Malshe, Rencis, Schmidt, West
- Associate Professors Couvillion, Gordon, Nutter, Roe, Tung, Springer
- Assistant Professors Spearot, Zhang, Zou
- Instructor Davis

• Adjunct Professor Cole
• Adjunct Assistant Professor Batzer

Degrees Conferred:

M.S.M.E. (MEEG)
M.S.E. (ENGR)
Ph.D. in Engineering (ENGR) (See Engineering)

Areas of Concentration: Thermal systems, mechanical design, materials science, engineering mechanics, and nuclear engineering.

Primary Areas of Faculty Research: Micro Electromechanical Systems (MEMS); Micro and Nano Systems; Boundary Elements; Finite Elements, Structural Dynamics, and Modal Analysis; Industrial and Commercial Energy Systems and Energy Conservation; Dry Machining, Advanced Tooling and Coatings; Thermal and Mechanical Design of Electronic Packages; Material Failure Analysis and Design of Experiments.

Requirements for the Master of Science Degree: In addition to the requirements of the Graduate School and the graduate engineering faculty, the following departmental requirements must be satisfied by candidates for the M.S.M.E. degree.

1. Candidates who present a thesis are required to complete a minimum of 24 semester hours of course work and six semester hours of thesis.
2. Candidates who do not present a thesis are required to complete a minimum of 33 semester hours of course work, which is to include at least three hours of credit for Research or Special Problems (including a formal engineering report), completed under direction of the candidate's major adviser.
3. All students must present a grade-point average of 3.00 or better on all courses included in their plan of study, with no more than 6 hours of "C."

Requirements for the Doctor of Philosophy Degree (Engineering): Students desiring to pursue a doctoral degree in engineering under the direction of a professor in the Department of Mechanical Engineering must obtain a set of guidelines from the Department Head.

Mechanical Engineering (MEEG)

MEEG4003 Intermediate Dynamics (Irregular) Principles and application of dynamics from a more advanced point of view than in MEEG 2013. Topics include use of rotating reference frames, kinematics, and kinetics of rigid bodies in 3 dimensions, and oscillations. Prerequisite: MEEG 2013.

MEEG4213 Control of Mechanical Systems (Iregular) Mathematical modeling for feedback control of dynamic mechanical systems with design techniques using LaPlace transforms, state variables, root locus, frequency analysis, and criteria for performance and stability. Prerequisite: MEEG 3113. (Same as CENG 4403,ELEG 4403)

MEEG4223 System and Signal Analysis (Irregular) Discrete and continuous time dynamic systems, convolution, Fourier and z-transforms, FFT, stability, frequency response, filtering, state variable models, analysis, digital system simulation and Masons Rule. Credit cannot be earned for both MEEG 4233 and ELEG 3123. Prerequisite: (ELEG 2113 or ELEG 3903) and MATH 3404. (Same as ELEG 3123)

MEEG4233 Microprocessors in Mechanical Engineering I: Electromechanical Systems (Irregular) Microcomputer architectural, programming, and interfacing. Smart product design (microprocessor-based design). Control of DC and stepper motors and interfacing to sensors. Applications to robotics and real-time control. Mobile robot project. Digital and analog electronics are reviewed where required. Prerequisite: ELEG 3913.

MEEG4303H Honors Materials Laboratory (Irregular) A study of properties, uses, testing, and heat treatment of basic engineering materials. Corequisite: Lab component. Prerequisite: MEEG 2303 and MEEG 3013. (Same as MEEG 4303)

MEEG4303 Materials Laboratory (Irregular) A study of properties, uses, testing, and heat treatment of basic engineering materials and related analytical techniques. Corequisite: Lab component. Prerequisite: MEEG 2303. (Same as MEEG 4303H)

MEEG4413 Heat Transfer (Sp, Su) Basic thermal energy transport processes; conduction, convection, and radiation; and the mathematical analysis of systems involving these processes in both steady and time-dependent cases. Prerequisite: MEEG 3503 and MEEG 2703.

MEEG4423 Power Generation (Irregular) Study of design and operational aspects of steam, gas, and combined cycle power plants. Brief study of Nuclear and Alternative energy systems. Prerequisite: MEEG 3503.

MEEG4433 Aerospace Propulsion (Irregular) Principles, operation, and characteristics of gas turbine and rocket engines. Brief study of novel spacecraft propulsion systems. Prerequisite: MEEG 3503.

MEEG4443 Thermal and Vibration Analysis and Testing of Electronics (Irregular) Packaging, manufacture, and failure mechanisms of boards and assemblies. Analysis of overheating, thermal stress, and vibration. Laboratory testing and environmental stress screening. Corequisite: Lab component. Prerequisite: INEG 4513 or ELEG 4273.

MEEG4453 Industrial Waste and Energy Management (Irregular) Applications of thermodynamics, heat transfer, fluid mechanics, and electric machinery to the analysis of waste streams and energy consumption for industrial facilities. Current techniques and technologies for waste minimization and energy conservation including energy-consuming systems and processes, utility rate analysis, economic analysis and auditing are taught. Prerequisite: MEEG 4413.

MEEG4473 Indoor Environmental Control (Irregular) Gives student a thorough understanding of the fundamental theory of air conditioning design for commercial buildings, including calculating heating and cooling loads along with the proper selection and sizing of air conditioning equipment. Prerequisite: MEEG 4413.

MEEG4483 Thermal Systems Analysis and Design (Fa, Su) Analysis design and optimization of thermal systems and components with examples from such areas as power generation, refrigeration, and propulsion, Availability loss characteristics of energy systems and availability conservation methods. Prerequisite: MEEG 4413.

MEEG4523 Astronautics (Irregular) Study of spacecraft design and operations. Prerequisite: MEEG 2013 and MEEG 2403 or consent of instructor.

MEEG4603 Basic Nuclear Engineering (Irregular) Principles of atomic and nuclear physics, including: fusion and fission reactions, radioactive decay, and neutron interactions. Introduction to nuclear reactor theory, types, components, and behavior. Prerequisite: PHYS 2074 and MATH 2574.

MEEG4623 Radiation Protection and Shielding (Irregular) Aspects of personnel radiation protection and shielding design as applied to the operating nuclear power plant, research laboratory, or other nuclear facility. Prerequisite: PHYS 2074 and MATH 2574.

MEEG4633 Nuclear Power Generation (Irregular) Thermal energy analysis and design of nuclear power reactors and power plants including thermodynamical analysis of components and cycle, thermal hydraulic aspects, core energy distribution, and fluid transients. Emphasis is on pressurized water reactors and boiling water reactors. Prerequisite: MEEG 3503 and MATH 3404 and MEEG 2403.

MEEG4703 Mathematical Methods in Engineering (Irregular) Determinants, matrices, inverse of a matrix, simltaneous equations, eigenvalues, eigenvectors, coordinate transformations for matrices, diagonalization, square roots of a matrix, cryptography, and method of least squares. Vector algebra and calculus, Green's theorem, Strokes' theorem, and Gauss' divergence theorem. Index notation, epsilon-delta identity, and Cartesian tensors. Curvilinear coordinates, base vectors, and covariant and contravariant tensors. Applications to mechanics. Prerequisite: MATH 2574.

MEEG4813 Air Pollution Abatement (Irregular) Design of air pollution abatement systems and equipment including cyclones, bag filters, and scrubbers. Other topics discussed are air pollution regulations: permitting, dispersion modeling, and national air quality standards.

MEEG4843 Environmentally Conscious Design and Manufacturing (Irregular) The course will provide an introduction to the environmental aspects of production design and illustrate the consequences and costs of waste generation and pollution abatement. The course will also define pollution prevention and waste minimization techniques and will introduce the student to the design for the environment (DfE) concept, life cycle analysis, and total quality environmental management techniques.

MEEG5003 Continuum Mechanics (Odd Years, Sp) Index notation, Cartesian tensor and review of related essential mathematics. Analyses of stress and strain, Lagrangian and Eulerian descriptions; Caushy stress principle, stress tensor and transformation laws, invariants, principal stresses and principal stress directions, and Mohr's circle for stresses. Equations of equilibrium, compatibility equations; material derivatives, rotation tensor, and stretch tensor. Balance laws, field equations, constitutive equations, continuity equation; and first and second laws of thermodynamics. Prerequisite: MEEG 3013 and MEEG 4703.

MEEG5013 Advanced Mechanical Vibrations (Irregular) Continuation of MEEG 4013 with a more analytic approach. Included are techniques for modeling and understanding the vibratory behavior of multi-degree of freedom discrete systems, continuous systems, nonlinear systems, and random variables. Prerequisite: MEEG 4013.

MEEG5033 Advanced Mechanics of Materials I (Irregular) Combined stress, theories of failure, thick-walled cylinders, bending of unsymmetrical sections, torsion in noncircular section, plate stresses, and strain energy analysis. Prerequisite: MEEG 2013 and MEEG 3013.

MEEG5103 Structural Dynamics (Fa) The forced and random vibration response of complex structural systems are studied through the use of the finite element method. Computational aspects of these problems are discussed and digital computer applications undertaken. Prerequisite: MEEG 3113 and MEEG 4103 and graduate standing.

MEEG5113 Modal Analysis Methods (Sp) Fundamental concepts of both analytical and experimental modal analysis methods are examined and applied to the study of complex structural systems. Computational aspects of these problems are discussed, and digital computer applications undertaken with experimental verification. Prerequisite: MEEG 5103 and graduate standing.

MEEG5123 Finite Elements Methods II (Irregular) Development and application of finite element (FE) methods used to solve transient and two-dimensional boundary value problems. Applications are taken from solid and fluid mechanics, heat transfer, and acoustics. Emphasis is placed on the FE methodology in order to make accessible the research literature and commercial software manuals, and to encourage responsible use and interpretation of FE analysis. Prerequisite: MEEG 4123 and graduate standing or consent.

MEEG5143 Advanced Machine Design (Su) Application of advanced topics such as probability theory, fracture mechanics, and computer methods to the design and analysis of complex mechanical systems. Prerequisite: MEEG 4103 and graduate standing.

MEEG5213 Microprocessors in Mechanical Engineering II Real-time Control (Irregular) Feedback control system theory and design. C programming. Microcontroller interfacing. Real-time control of electromechanical systems in laboratory projects using a

single-board computer as the controller. Prerequisite: MEEG 4233.

MEEG5253 Bio-Mems (Sp) Topics include the fundamental principles of microfluidics, Navier-Stokes Equation, bio/abio interfacing technology, bio/abio hybrid integration of microfabrication technology, and various biomedical and biological problems that can be addressed with microfabrication technology and the engineering challenges associated with it. Lecture 3 hours per week. Prerequisite: MEEG 3503 or CVEG 3213 or CHEG 2133. (Same as BENG 5253)

MEEG5263 Introduction to Micro Electro Mechanical Systems (Fa) A study of mechanics and devices on the micro scale. Course topics will include: introduction to micro scales, fundamentals of micro fabrication, surface and bulk micromaching, device packaging, device reliability, examples of micro sensors and actuators. Recitation three hours per week.

MEEG5273 Electronic Packaging (Sp) An introductory treatment of electronic packaging from single chip to multichip including materials, electrical design, thermal design, mechanical design, package modeling and simulation, processing considerations, reliability, and testing. Credit cannot be earned for both MEEG 5273 and ELEG 5273. Prerequisite: (ELEG 3213 or ELEG 3913) and MATH 3404. (Same as ELEG 5273)

MEEG5303 Physical Metallurgy (Fa) Physical and chemical properties of solids and the application of materials in commerce. Prerequisite: MEEG 2303.

MEEG5313 Materials and Design (Irregular) Analysis, design, and testing of high strength and modulus materials, brittle materials, composites, and anisotropic materials. Effect of environment on design with particular emphasis on nuclear application. Prerequisite: MATH 3404 and graduate standing.

MEEG5323 Physical and Chemical Vapor Deposition Processes (Sp) Fundamental principles of materials behavior in the deposition of films by PVD/CVD. Topics include kinetic theory of gases, statistical mechanics, plasmas, diagnostics, reaction rate theory, nucleation and growth, crystal structures and defects in thin films, advanced characterization techniques for thin films, and applications in microelectronics, tribology, corrosion, bio- and nano-materials. Prerequisite: graduate standing in Engineering or consent of instructor.

MEEG5393 Engineering Materials Topics (Irregular) Detailed study of selected materials engineering topics; topics will vary, buy may include diffusion processes in solids, thermodynamics of solids, fracture of materials, failure analysis, advanced techniques in electron microscopy, analytical methods in materials science, advanced corrosion and engineering, etc. Prerequisite: graduate standing.

MEEG5403 Advanced Thermodynamics (Sp) An in-depth review of classical thermodynamics, including availability analysis, combustion, and equilibrium, with an introduction to quantum mechanics and statistical thermodynamics. Prerequisite: Graduate standing in Engineering or consent of instructor.

MEEG5423 Statistical Thermodynamics (Irregular) Concepts and techniques for describing high temperature and chemically reactive gases from a molecular point of view. Introductory kinetic theory, chemical thermodynamics, and statistical mechanics applied. Prerequisite: MEEG 2403 and MATH 2574.

MEEG5433 Combustion (Fa) Introduction to combustion of solid, liquid, and gaseous fuels. Equilibrium and kinetics of hydrocarbon oxidation, laminar and turbulent flames, premixed and non-premixed combustion processes, ignition, quenching, stability, emissions and diagnostics. Prerequisite: Graduate standing in Engineering or consent of instructor.

MEEG5453 Advanced Heat Transfer (Fa) More in-depth study of topics covered in MEEG 4413, Heat Transfer, and coverage of some additional topics. Prerequisite: MEEG 4413 or CHEG 3143 or equivalent.

MEEG5463 Conduction and Convection Heat Transfer (Odd Years, Su) Deeper, broader coverage of topics studied in MEEG 4413 and 5453. Steady and transient, one and multidimensional conduction with emphasis on solution methods, analytical and numerical. Forced and free convection in laminar and turbulent, internal and external flow. Porous media heat and mass transfer and/or mass diffusion. Prerequisite: MEEG 5453 or equivalent.

MEEG5473 Radiation Heat Transfer (Even years, Su) Spectral analysis, radiant exchange in gray and non-gray enclosures, gas radiation, and multi-mode heat transfer. Prerequisite: MEEG 5453 or equivalent.

MEEG5503 Advanced Fluid Dynamics I (Sp) A basic survey of the characteristics of fluid flow under a variety of conditions with examples. Begins with a derivation of the Navier-Stokes equations and an evaluation of the dimensionless groups found from these equations. Topics to be covered include viscous laminar and turbulent boundary layers, jets and wakes, Stokes flow, inviscid flows with and without free surfaces and turbulence. Prerequisite: MEEG 3503 and MATH 3404.

MEEG5513 Gas Dynamics (Irregular) Basic concepts of gas dynamics and gas properties applied to compressible flows including quasi one-dimensional isentropic flow in variable area ducts, normal shock waves, flow in ducts with friction, heating and cooling, oblique shock and expansion waves and shock tube flow. Prerequisite: MEEG 3503 and MATH 2574.

MEEG5643 Nuclear Heat Transport (Irregular) Heat generation and removal in nuclear power reactors, including water, gas, and liquid-metal cooled designs; boiling and 2-phase flow considerations. Prerequisite: MEEG 4603 and MEEG 4413 and MEEG 3503.

MEEG5733 Advanced Numerical Methods (Sp) Numerical methods for the solution of linear and non-linear ordinary and partial differential equations; initial and boundary value problems; one-step and multi-step methods; predominantly finite difference but also finite element and control volume techniques; and computer applications. Graduate standing in Engineering or consent of instructor.

MEEG590V Research (Sp, Su, Fa) (1-6) Fundamental or applied research. Prerequisite: graduate standing.

MEEG591V Special Problems (Sp, Su, Fa) (1-6) Prerequisite: graduate standing. May be repeated for 6 hours.

MEEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

MEEG6263 Advanced Micro Electro Mechanical Systems (Sp) An advanced study of microscale mechanics and devices. The course material will include in depth discussion of 3 to 4 current MEMS technology areas such as microfluidics, optical MEMS, and inertial sensors. Students will also be required to fabricate and test a functional MEMS device in a processing laboratory. Recitation one hour per week. Laboratory fours hours per week. Prerequisite: MEEG 5263.

MEEG6273 Advanced Electronic Packaging (Irregular) An advanced treatment of electronic packaging concentrating on multichip modules. Topics covered include electrical design, thermal design, mechanical design, package modeling and simulation, computer-aided engineering and design, processing limitations on MCM performance, reliability, testing, and economic considerations. Prerequisite: ELEG 5273. (Same as ELEG 6273)

MEEG6800 Graduate Seminar (Sp, Fa) A periodic seminar devoted to mechanical engineering research topics. Appropriate grade to be "S."

MEEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

MICROELECTRONICS – PHOTONICS (MEPH)

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Biological Engineering Faculty:
- Professor Li
- Assistant Professors Kavdia, Kim, Ye

Chemical Engineering Faculty:
- Professors Beitle, Ulrich

Chemistry Faculty:
- Professors Fritsch, Gawley, Peng
- Assistant Professor Tian

Civil Engineering Faculty:
- Professor Selvam

Computer Science/Computer Engineering Faculty:
- Associate Professor Lusth
- Assistant Professor Di

Electrical Engineering Faculty:
- Distinguished Professors Varadan (V.K), Varadan (V.V.)
- University Professor Brown
- Professors Ang, Balda, Mantooth, Naseem, Schaper
- Associate Professors Barlow, Burkett, El-Shanawee, Manasreh
- Research Associate Porter

Industrial Engineering Faculty:
- Associate Professor Mason

Management (WCOB) Faculty:
- Professor Todd

Mechanical Engineering Faculty:
- Professors Bhat, Malshe, Schmidt
- Associate Professors Gordon, Tung
- Assistant Professors Spearot, Zou

Microelectronics-Photonics Faculty:
- Research Associate Professor Foster

Physics Faculty:
- Distinguished Professors Salamo, Xiao
- Professors Bellaiche, Singh
- Research Professor Vickers
- Associate Professor Oliver
- Assistant Professors Chakhalian, Fu, Li
- Research Associate and Adjunct Professor Shultz

Degrees Conferred:

M.S., Ph.D. in Microelectronics-Photonics (MEPH)

This multidisciplinary program prepares students for pursuing careers in the development and manufacturing of high tech materials, devices, and systems in such industries as photonics, telecommunications, microelectronics, and MEMs. It is expected that typical students in this program will be full-time students residing on campus, but provisions may be made to support remotely located part-time students already engaged in professional careers.

Philosophy of Graduate Education: All entering graduate students from June 1 through May 31 of the following year are formed into a Cohort. Cohort members form a natural work group during their first twenty-four months of graduate school, and the Cohort receives training in how to effectively apply their academic knowledge in professional group environments such as research- or teaching-based academic departments, large governmental research labs, or industrial settings. The Cohort training also fosters a supportive graduate community atmosphere that enhances the likelihood of academic success of all the program's graduate students.

The techniques used for this training have been developed at the University of Arkansas under the financial sponsorship of the NSF Integrative Graduate Education and Research Training (IGERT) program, and the Department of Education's Fund for Improvement of Post Secondary Education (FIPSE) program. Through these methods, our graduate students exit our degree programs with the equivalent of one and a half years of on-the-job training in management techniques useful in a technology-based professional career setting.

Prerequisites to Degree Program: Applicants to the program must satisfy the requirements of the Graduate School as described in this catalog and have the approval of the Graduate Studies Committee of the Microelectronics-Photonics program (GSCMEP).

Candidates must have completed a Bachelor of Science degree in either engineering or science, and candidates' academic backgrounds will be evaluated by the GSCMEP for suitability to the graduate program. To be admitted to graduate study in Microelectronics-Photonics (microEP) without deficiency, candidates are required to have completed a math course sequence through differential equations, a calculus-based physics course sequence through introduction to quantum mechanics, and a junior-level introduction to electricity and magnetism. Other undergraduate deficiencies may be identified during the evaluation process, and degree completion will be contingent on successful completion of these identified deficiencies.

Prospective students from foreign countries in which English is not the native language must submit nationally recognized standardized testing results on written English proficiency for consideration to the Graduate School during the admission process. Students may be given conditional admittance pending demonstration of English language skills in appropriate courses at the University of Arkansas. Students wishing to apply for graduate assistantships that require direct contact with students in a teaching or tutorial role in a department must meet that department's English Language proficiency test requirements and the requirements of the Graduate School for such GA positions.

Requirements for the Master of Science Degree: Students choosing this degree program will be assigned an initial advisor upon acceptance to the program. This advisor will be their Cohort Manager during that academic year. Students will work with the Director of the microEP program to define their thesis committee after they are accepted by a research faculty for a research project. This committee will be made up of at least three faculty members, with at least one faculty member each from the Fulbright College of Arts and Sciences and the College of Engineering. The student's research professor will chair the thesis committee.

Students in this degree program can choose either a research path or an independent project path. The minimum course hour requirements for both paths are as follows:

Topic	Research Course Hours	Independent Project Course Hours
Science	6	6
Engineering	9	12
Business	3	3
Technical elective	9	15
Research thesis	6	0
Independent project	0	3
Total hours	33	39

Four core courses have been defined that are required of all students completing microEP degrees. These courses are ELEG 4203 Semiconductor Devices; PHYS 5774 Introduction to Optical Properties of Materials; ELEG 5213 Integrated Circuit Fabrication Technology, and MGMT 5383 Intra/Entrepreneurship of Technology. Students that have acquired the knowledge contained in these courses through prior education may petition the microEP program Director for permission to substitute other classes for these core courses. One additional key course is also required, with the current listing of these courses contained in the microEP Graduate Handbook.

Additional core courses to develop operations management skills also have been defined for microEP students. During year one of their graduate studies at the University of Arkansas, students are required to take MEPH 5811 Research and Operations Management Seminar in both fall and spring semesters and MEPH 5821 Ethics for Scientists and Engineers in their first summer. During year two, students are required to take MEPH 6811 Research and Operations Management Seminar in both fall and spring semesters and MEPH 5831 Proposal Writing and Management in their second summer. In addition, all cohort members participate in two days of industrial-style inventiveness and team training during the week directly preceding the start of fall classes. Three of these six credit hours may be used as M.S. technical electives, and the other three may be applied as Ph.D.-level technical electives.

Research thesis hours will be chosen from the department of the student's research adviser (PHYS 600V, ELEG 600V, etc.) and will require a written thesis successfully defended in a comprehensive oral exam given by the thesis committee. Independent project hours will be under MEPH 588V Special Problems in Microelectronics-Photonics and will require a written project report successfully defended in a comprehensive oral exam given by the advisory committee.

Requirements for the Doctor of Philosophy Degree: Students choosing this degree program will be assigned an initial advisor upon acceptance to the program. This advisor will be their Cohort manager during that academic year. Students will work with the Director of the microEP program to define their dissertation committee after they are accepted by a research faculty for a research project. This committee will be made up of at least four faculty members, with at least one faculty member each from the Fulbright College of Arts and Sciences and the College of Engineering. The student's research professor will chair the dissertation committee.

Candidates for the Ph.D. program are expected to have completed a Master of Science degree in either engineering or science, with each candidate's academic background being evaluated by the GSCMEP. Doctoral candidates in Microelectronics-Photonics are expected to have proficiency in the core course work of the Master of Science in Microelectronics-Photonics at the University of Arkansas. This core is described in detail in the handbook of the Microelectronics-Photonics program and is the knowledge area that will be tested in the Microelectronics-Photonics specific candidacy exam administered in the spring semester of each academic year.

Students who have graduated with a Master of Science degree in Microelectronics-Photonics from the University of Arkansas will be expected to take the Microelectronics-Photonics Ph.D. candidacy exam in the spring semester after M.S. graduation. Students requesting admission to the Ph.D. program with a Master of Science degree in another discipline will be required to take the Microelectronics-Photonics Ph.D. candidacy exam within four semesters after M.S. graduation.

Students who fail to pass their candidacy exam will have a joint consultation with their major professor and their Cohort Manager to formulate a specific action plan to correct student deficiencies identi-

fied by the exam. The student will be allowed to retake the exam one additional time during the next scheduled examination period.

A Ph.D. curriculum will be defined to meet each student's research interests as well as the Microelectronics-Photonics program's interest in course breadth. It is to be expected that certain Master of Science degrees will be poorer matches to the Microelectronics-Photonics program focus areas and will therefore require a greater number of graduate courses in the Ph.D. curriculum as a requirement for graduation.

The course plan for each student must include a minimum of 30 hours of graduate coursework beyond the Master of Science degree requirements. Specific courses will be chosen by the student and must be approved by the student's doctoral advisory committee. The coursework list for the Ph.D. degree will then be combined with the courses completed during the student's Master of Science studies to assure that the combined course list includes:

a) at least 27 hours of 5000- and 6000-level courses in science and engineering,
b) at least six hours of courses relevant to the management of technology,
c) no more than six hours of special problems and no more than nine hours of special topics courses,
d) and no more than three hours of MEPH 5811/6811/5821/5831 after completion of the M.S. degree.

In addition to these conditions, the 18 hours of research dissertation required by the Graduate School will be taken under departmental course numbers such as PHYS 700V, CHEG 700V, CHEM 700V, ELEG 700V, etc. as appropriate to match to the department of each student's major research professor.

Microelectronics-Photonics (MEPH)

MEPH5613 Introduction to Advanced Computation for Scientists and Engineers (Su) Introduction to computer modeling in science and engineering and their advantages. Review of programming needed for modeling applications. Introduction to finite difference and finite element procedures to solve science and engineering problems. Importance of visualization and grid generation. Prerequisite: senior standing or graduate student in science or engineering.

MEPH5713 Advanced Nanomaterials Chemistry (Sp) Most science and engineering graduates will one day face materials problems. Nanomaterials are evolving to be the backbone of high-tech industry. Modern as well as future industry demands more and more scientists and engineers with materials chemistry knowledge. Learn how to understand materials from the perspective of funamental chemistry principles, be exposed to the frontiers of materials science and technology, and build up a picture of tomorrow's materials. Pre- or Corequisite: lab experience in physics, chemistry, or biology. Prerequisite: general chemistry. May be repeated for 3 hours.

MEPH5723 Science of Nanostructures (Sp) This is a cross-disciplinary course that is focused on teaching nanoscience and engineering by studying surface science, the building and analysis of quantum-confined structures, and related nano manufacturing processes. Students will achieve an integrated knowledge of the concepts of surface science, quantum mechanics, nano processing and manipulation, and techniques of materials research. Prerequisite: MEPH 5713.

MEPH5811 Operations Seminar (Sp, Su, Fa) Weekly seminar of Microelectronics-Photonics candidates for the Master of Science degree to discuss issues that impact a technical group's operational effectiveness. Topics to be discussed include ethics, applications of procedures, cultural impact on operations, and team based methodologies. Discussions of current events in the interaction between technology and human affairs will be included as appropriate. Prerequisite: graduate standing.

MEPH5821 Ethics for Scienctists and Engineers (Su) This course will introduce methods useful in the practice of ethical decision making in the high technology academic and industrial work place. An emphasis will be placed on applying the methods discussed in the text to student and instructor past professional experiences. Prerequisite: graduate standing.

MEPH5831 Proposal Writing and Management (Su) Advanced scientific and engineering research and development typically requires significant resources to be successful. This course introduces the student to the factors that impact proposal success in both the academic and industrial arenas; it demonstrates different approaches to writing the content of different sections of successful proposals; and it introduces the student to the legal responsibilities and ramifications of proposal management. At the end of the class, each student will have ready for submission at least one proposal to an appropriate funding agency for their research group. Prerequisite: graduate standing.

MEPH587V Special Topics in Microelectronics-Photonics (Irregular) (1-3) Consideration of current microelectronic-photonic topics not covered in other courses. May be repeated for 9 hours.

MEPH588V Special Problems in Microelectronics-Photonics (Sp, Su, Fa) (1-3) Opportunity for individual study of advanced subjects related to a graduate degree in Microelectronics-Photonics to suit individual requirements. May be repeated for 6 hours.

MEPH6811 Operations Seminar (Sp, Su, Fa) Weekly seminar of Microelectronics-Photonics candidates for Doctor of Philosophy degree to discuss issues that impact a technical group's operational effectiveness. Topics to be discussed include ethics, applications of procedures, cultural impact on operations, and team based methodologies. Discussions of current events in the interaction between technology and human affairs will be included as appropriate. Prerequisite: graduate standing.

MIDDLE-LEVEL EDUCATION (MLED)

Tom Smith
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Web: http://www.uark.edu/depts/coehp/CIED.htm/

- Professor Totten
- Associate Professors Johnson, Morrow

Degree Conferred:

M.A.T. (MLED)

The University of Arkansas offers the Bachelor of Science (B.S.E.) and Master of Arts in Teaching (M.A.T.) degrees in Middle-Level Education. These combined degree programs constitute the University of Arkansas initial teacher licensure program in Middle-Level Education (Grade 4 through Grade 8). Students who obtain their B.S.E. degree from the University of Arkansas will have completed the prerequisite course requirements for entry into the M.A.T. program. Students who obtain a bachelors degree from another university and/or in a program area other than Middle-Level Education must have their transcripts evaluated by a Middle-Level Education program adviser (Peabody Hall, 208A, 479-575-7244) to determine what deficiencies must be met before they can be considered for admission into the M.A.T. program. The M.A.T. degree program is a 33-semester hour program. To be recommended for licensure by the University of Arkansas, students must successfully complete the M.A.T. degree program.

Prerequisites to the M.A.T. Degree Program: Students will be selected up to the maximum number designated for each cohort area of emphasis.

Admission Requirements:

1. Completion of a B.S.E. in Middle Level Education (Social Studies/English, English/Social Studies, Math/Science or Science/Math)
2. Passing Scores on Praxis I
3. Cumulative GPA of 3.00 in all previous courses
4. Admission to the Graduate School
5. Completion of the pre-education core with a minimum of "C" in all courses:
   CIED 1002 Introduction to Education
   CIED 1011 Introduction to Education Practicum
   ETEC 2001 Educational Technology
   ETEC2002L Educational Technology Lab
   CIED 3023 Survey of Exceptionality
   CIED 3033 Classroom Learning Theory
   CIED 3043 Introduction to Middle level Principles & Methods
   CIED 3053 The Emerging Adolescent
   CIED 3063 Literacy Strategies for Middle Level Learners
   CIED 3073 Early Adolescent Literature
6. A minimum of a "C" or higher must be earned in ENGL 1013, ENGL 1023, ENGL 2003, COMM 1313, and MATH 1203, unless UA exemption is earned in one or more of the courses.
7. Completion of all prerequisite courses in teaching field.
8. Satisfactory completion of Pre-M.A.T. degree check
9. Recommendation from the Department of Curriculum and Instruction based upon:

a. Middle-level writing assessment
b. Interview with middle level education faculty and public school administrators and faculty
c. Portfolio

Requirements for the Middle Level Master of Arts in Teaching Degree: (Minimum 34 hours)

Summer II (5 weeks) (On campus)
CIED 5052 M-T SEM: Multicultural Issues
CIED 5093 Middle Level Methods
ETEC 5062 M-F Teaching & Learning with Comp.-Based Tech.
Total Hours 6

Fall Semester (18 weeks)
Integrated Learning Experiences
CIED 5113 ARR Reading Across the Middle Level
CIED 5193 ARR Intermediate Special Methods
CIED 5022 ARR Classroom Management Concepts
CIED 5132 ARR Research in Middle Level Curric. & Instr.
CIED 514V ARR Internship: Middle Level
Total Hours 13

Spring Semester (15 weeks)
Integrated Learning Experiences
CIED 5293 ARR Special Methods, Interdisciplinary Section
CIED 5103 ARR Adv. Middle Level Principles and Methods
CIED 5012 ARR Measurement, Research, and Statistical Concepts for Teachers
CIED 5123 ARR Writing Process Across the Curriculum
CIED 514V ARR Internship: Middle Level
Total Hours 14
Grand Total 33 hours

Passing grade on the final research project and a passing grade on the presentation of findings.

MUSIC (MUSC)

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- Professors Cencel, Detels, Gates, Greeson, Mains, Mueller, Ragsdale, Ramey, Sloan, Thompson, Warren, Wolpert
- Research Professor Markham
- Associate Professors Jones, Margulis (J.), Misenhelter, Yoes
- Visiting Associate Professor Goza
- Assistant Professors Cholthitchanta, Hickson, Jekova-Goza, Langager, Margulis (E.), Pierce, Rulli
- Visiting Assistant Professors Gunter, Lacy
- Adjunct Assistant Professors Lennertz, Thomas
- Instructor Delaplain
- Lecturers Morris, Runkles

Degree Conferred:

M.M. (MUSC)

Graduate Certificate Offered:

Advanced Instrumental Performance (non-degree)

Areas of Concentration for the M.M. in Music: Applied music, composition, theory, instrumental and choral conducting, music history, and music education.

Prerequisites to Degree Program: To enter the Master of Music program, students should apply to the Director of Graduate Studies in Music for the specific degree program in which they are interested. Students wishing to change from one degree program or major applied area to another must also apply to the Director of Graduate Studies in Music. The Department Chair and the Director of Graduate Studies in Music, in consultation with the faculty of the specific area, determine acceptance, provisional acceptance contingent on the making up of specific deficiencies, or rejection of the student for admission to the degree program in the specific area of concentration.

Requirements for the Master of Music Degree: In addition to the general requirements of the Graduate School the following must be met:

1. All students seeking admission to the program for the degree of Master of Music, with concentrations in Performance, Composition, Theory, History, and Conducting, must show evidence of satisfactory proficiency in aural and written theory and in music history and literature. This shall be done by means of an aural and written theory and history diagnostic examination administered by the department. Any student who has not demonstrated satisfactory proficiency in these areas prior to entrance will be registered in remedial or refresher courses. Students seeking admission to the program for the degree of Master of Music with a concentration in Music Education should consult with the Director of Graduate Studies in Music for proficiency requirements.
2. Applicants will be advised by the major professor in the area of concentration regarding piano proficiency requirements.
3. All Performance applicants must present an audition with repertoire corresponding to that required for the degree of Bachelor of Music at the University of Arkansas; this may be done by recording.
4. All non-performance applicants may take placement auditions upon beginning residency.
5. Applicants in composition will submit scores of at least three of their compositions.
6. Applicants in music history will pass a reading examination in French, German, or Italian and will demonstrate knowledge of common music terms in all three languages before admission to candidacy.
7. In addition to completing the specified requirements, the candidate will take comprehensive written examinations followed by the oral examination.
8. All candidates for the degree of Master of Music, except those in composition (D.), music theory (E.), music history (unless pursuing the early music performance option) (F.), and music education (J.), must participate in at least one ensemble per semester throughout their residence.

The programs of study are listed below. All course selections are subject to approval of the graduate adviser in consultation with applied teacher or thesis director.

	HOURS
A. **Master of Music in Performance, Instrumental:**	36
I. APPLIED MUSIC	16
Requirements include: 1) MUAP 510V for four semesters, total 14 hours, to include:	

2) MUAP 5201 (solo recital)
3) MUAP 5211 (chamber recital)

II. MUSIC HISTORY AND MUSIC THEORY 12
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) One music history course to be selected from MUHS 5753, 5773, 5783, 5793

3) One music theory course to be selected from MUTH 477V (3), 5623, 5343, 5643
4) Electives totaling 3 hours in either music history and/or music theory to be selected from (2) or (3) above or MUHS 4253 or 4963H

III. ELECTIVES 8
To be selected from music courses at the 4000-6000 level with the consent of the adviser and to include not more than 4 hours of ensemble. **Note:** Study of the appropriate literature is required if not adequately covered in the undergraduate degree presented for admission but will count toward the degree as an elective.

B. **Master of Music in Performance, Keyboard:** 36
I. APPLIED MUSIC 16
1) MUAP 510V for four semesters, total 14 hours, to include preparation of one complete concerto
2) MUAP 5201 (solo recital)
3) MUAP 5211 (chamber recital)

II. MUSIC HISTORY AND MUSIC THEORY 12
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) One music history course to be selected from MUHS 5753, 5773, 5783, 5793
3) One music theory course to be selected from MUTH 477V (3), 5623, 5343, 5643
4) Electives totaling 3 hours in either music history and/or music theory to be selected from (2) or (3) above or MUHS 4253 or 4963H

III. ELECTIVES 8
To be selected from music courses at the 4000-6000 level with the consent of the adviser and to include not more than 4 hours of ensemble. Note: Study of keyboard literature is required if not adequately covered in the undergraduate degree presented for admission but will count toward the degree as an elective.

C. Master of Music in Performance, Voice: 36
I. APPLIED MUSIC 18
Requirements include:
1) MUAP 510V for four semesters, total 14 hours, to include:
a) Preparation of one complete operatic or oratorio role
b) Demonstration of language proficiency in English and three foreign languages
2) MUAP 5201 (solo recital)
3) MUAP 5211 (chamber or solo recital)
4) MUEN 5401 (two semesters) Opera Theater

II. MUSIC HISTORY AND MUSIC THEORY 12
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) One music history course to be selected from MUHS 5753, 5773, 5783, 5793
3) One music theory course to be selected from MUTH 477V (3), 5623, 5343, 5643
4) Electives totaling 3 hours in either music history and/or music theory to be selected from (2) or (3) above of MUHS 4253 or 4963H

III. ELECTIVES 6
To be selected from music courses at the 4000-6000 level with the consent of the adviser and to include not more than 4 hours of ensemble

D. Master of Music in Composition: 36
I. MUSIC THEORY AND COMPOSITION 21
1) MUTH 5643 Analysis of 20th Century Music
2) MUTH 568V Composition 6
3) MUTH 600V Master's Thesis 6
4) Electives in music theory 6

II. MUSIC HISTORY AND LITERATURE 6
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) At least one course from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)

III. ELECTIVES 9
Graduate-level courses to be selected from MUAP, MUEN (4 credit maximum), MUHS, MUTH, or MUPD areas or other disciplines with consent of the major adviser.

E. Master of Music in Music Theory: 36
I. MUSIC THEORY AND COMPOSITION 21
1) MUTH 5623 Pedagogy of Theory
2) MUTH 5643 Analysis of 20th Century Music
3) MUTH 600V Master's Thesis (6)
4) Courses to be selected from MUTH courses at the 4000- or 5000-level (9 hours minimum).

II. MUSIC HISTORY AND LITERATURE 6
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) At least one course from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)

III. ELECTIVES 9
Graduate-level courses to be selected from MUAP, MUEN (4 credit maximum), MUHS, MUTH, or MUPD areas or other disciplines with consent of the major adviser.

F. Master of Music in Music History: (Music history, early music performance practice.) 36
I. MUSIC HISTORY AND LITERATURE 20
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) At least three courses from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)
3) At least one course in the area of music literature, to be selected from MUHS 5722, 5732, 5952, 5943, or 4253, with the approval of the major adviser.
4) MUHS 600V Master's Thesis (6) or MUHS 601V Lecture-Recital (Early Music Performance Practice)

II. APPLIED MUSIC 4-8
4 hours minimum for music history emphasis OR 8 hour minimum for early music performance

practice emphasis, at least six of which are on early instruments
III. MUSIC THEORY AND COMPOSITION 4-8
Courses to be selected with the approval of the major adviser.
IV. ELECTIVES
Courses either within the music department or in related fields, subject to the approval of the major adviser.

G. **Master of Music in Instrumental Conducting** 36
I. MUSIC THEORY AND COMPOSITION 7
1) MUTH 4703 Form and Analysis
2) MUTH 4612 or MUTH 5672 Orchestration
3) MUTH 4322 Score Reading
II. MUSIC HISTORY AND LITERATURE 11-12
1) MUHS 5973 Seminar in Bibliography and Methods of Research
2) At least one course from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)
3) At least one course in the area of music litera ture, to be selected from MUHS 4793, 5943, 5952, 5962, or 4253 with the approval of the major adviser.
4) Other courses to be selected from 5000-level MUHS offerings
III. APPLIED MUSIC 4
MUAP 510V
IV. CONDUCTING 6
1) MUPD 582V Conducting IV
2) MUAP 5201 and 5211 Recitals (two recitals as conductor)
V. ELECTIVES 7-8

H. Master of Music in Choral Conducting 36
I. MUSIC THEORY AND COMPOSITION 7
1) MUTH 4703 Form and Analysis
2) MUTH 4612 or MUTH 5672 Orchestration
3) MUTH 4322 Score Reading
II. MUSIC HISTORY AND LITERATURE 11-12
1) MUHS 5973 Sem. - Bibliography and Methods of Research
2) At least one course from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)
3) MUHS 5952, 5962
4) Other courses to be selected from 5000-level MUHS offerings
III. APPLIED MUSIC 4
MUAP 510V
IV. CONDUCTING 6
1) MUPD 582V Conducting IV
2) MUAP 5211 Recitals (Two recitals as conductor.)
V. ELECTIVES 7-8

I. Master of Music in Music Education 36
I. MUSIC CORE 8-9
1)MUTH 5623 Pedagogy of Theory
2) MUHS 4793, MUHS 5952/5962, or MUHS 4703
3) MUAP 5001/510V Applied Music; two semesters; (2 hours minimum)
II. MUSIC EDUCATION CORE 16
1) MUED 5513 Seminar: Resources in Music Education
2) MUED 5811 Curriculum Design in Music
3) MUED 5653 Seminar: Issues in Music Education
4) MUED 5733 Music Education in the Elementary School
5) MUED 5973 Tests and Measurement in Music
6) MUED 5983 Psychology of Music Behavior
III. MUED 600V Master's Thesis 6
A research thesis in the field of music education. The thesis at the master's level may be preparatory or exploratory for a dissertation to be developed later in connection with work toward a doctorate, OR
IV. MUED 605V 3-6
(One of the following)
1) One (or more) original compositions
2) An arrangement of an existing large musical work for band, orchestra, chorus, or other ensemble.
3) Lecture-Recital
4) Development of an instructional method or innovative curriculum design.
5) A project involving educational planning, e.g., an administrative problem or a teaching or resource unit
V. ELECTIVES 5-9
Courses to be chosen with the consent of the advisory committee, to include some work in one of the following areas of specialization: Elementary, Secondary Choral, or Secondary Instrumental. A maximum of two hours of ensembles may count as electives.

Graduate Certificate in Advanced Instrumental Performance: (**Note:** This is not a degree.) The Graduate Certificate in Advanced Instrumental Performance will be a performance-intensive program for students who already possess the M.A. or its equivalent. It is designed for all applied instruments including the piano. It is intended for the serious, advanced performer who already possesses a graduate degree in music and wants to continue his/her intensive instrumental studies but does not want to enter a doctoral program where the emphasis is on academic coursework and a written dissertation.

Prerequisites to the Graduate Certificate: To enter this program, students must be admitted by the Graduate School and should apply to the Director of Graduate Studies in Music for the specific instrument in which they are interested. The Department Chair and the Director of Graduate Studies in Music, in consultation with the faculty of the specific area, will determine acceptance, provisional acceptance contingent on the making up of specific deficiencies, or rejection of the student for admission to the program in the specific area of concentration.

Requirements for the Graduate Certificate: In addition to the general requirements of the Graduate School the following conditions must be met:

1. All students seeking admission to the program for the Graduate Certificate must show evidence of outstanding performance aptitude and proficiency and demonstrate clear potential for a career as a professional musician.
2. All applicants must present an audition with advanced repertoire encompassing four different style periods and not lasting less than 30 minutes.
3. All applicants must display proficiency in music theory and history at the Master of Music level or equivalent through transcripts or an entry examination.
4. At the end of the program the student must present a full length

recital (ca. 70 min).

The programs of study are listed below. All course selections are subject to the approval of the graduate adviser in consultation with the applied teacher.

Graduate Certificate in Advanced Instrumental Performance (including piano): 16 hours

	HOURS
I. APPLIED MUSIC	10
1) MUAP 5104/5 for two semesters, total	9
2) MUAP 5201 (solo recital)	1
II. ELECTIVES	6

To be selected from music courses at the 4000-6000 level with the consent of the advisor. Possible areas of study include composition, conducting, chamber music, music theory, and music history.

Applied Music (Class) (MUAC)

MUAC4371 Teaching the High School Percussionist (Odd years, Sp) A study of solo literature and small and large ensemble literature appropriate for the high school percussionist. Emphasis on advanced snare drum and marimba lit., timpani and the broad range of percussionist intruments. Includes study of high school band, orchestra and perc. ensemble scores. Prerequisite: MUAC 1371.

Applied Music Private Inst (MUAP)

MUAP5001 Applied Voice/Instrument-Secondary Level (Sp, Su, Fa) Private study at the graduate secondary level. May be repeated for 99 hours.
MUAP510V Applied Voice/Instrument (Sp, Su, Fa) (1-5) Private study at the graduate level. Prerequisite: MUAP 310 or equivalent. May be repeated for 99 hours.
MUAP5201 Graduate Recital I (Sp, Su, Fa) Preparation and performance of a public recital of a minimum of 50 minutes of music. May be repeated for 99 hours.
MUAP5211 Graduate Recital II (Sp, Su, Fa) Preparation and performance of a public recital of a minimum of 50 minutes of music. May be repeated for 99 hours.

Piano, Organ, Voice, Viola, Violin, Violoncello, String Bass, Clarinet, Bassoon, Flute, Oboe, Alto Saxophone, French Horn, Trombone, Baritone, Tuba, Cornet, Trumpet, Percussion, Harpsichord, Historic String, Historic Wind.

Music Ensemble (MUEN)

MUEN5341 Collegium Musicum (Sp, Fa) Performance of early music for various combinations of instruments and/or voices. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5401 Opera Theatre (Sp, Fa) Study of opera through performances of scenes, chamber and major operatic production. Admission with director's approval. May be repeated for 99 hours.
MUEN5411 Concert Choir (Sp, Su, Fa) Rehearsal 3 hours per week with extra rehearsals at the director's discretion. Admission with director's approval. No audition required prior to registration. May be repeated for 99 hours.
MUEN5421 Inspirational Singers (Sp, Fa) Performance of African-American literature with particular emphasis on Negro Spirituals and traditional/contemporary gospel music. No audition required to registration. Rehearsal 3 hours per week. May be repeated for 99 hours.
MUEN5431 Symphony Orchestra (Sp, Su, Fa) Rehearsal 3 hours per week with extra rehearsals at director's discretion. Admission with director's approval. Corequisite: Lab component. May be repeated for 99 hours.
MUEN5441 Marching Band (Fa) Rehearsal 8 hours per week. Admission with director's approval. May be repeated for 99 hours.
MUEN5451 Schola Cantorum (Sp, Fa) Vocal ensemble limited to the more experienced singers. Rehearsal 5 hours per week. Admission with director's approval. Prerequisite: one year of MUEN 3411. May be repeated for 99 hours.
MUEN5461 Wind Symphony (Sp, Fa) Rehearsal 3 to 5 hours per week. Admission by audition and approval of the conductor. Corequisite: MUEN 5460L. May be repeated for 99 hours.
MUEN5471 Jazz Performance Laboratory (Sp, Fa) Training in the various styles of jazz and popular music. Rehearsal 3 hours per week. Admission by audition. May be repeated for 99 hours.
MUEN5481 Concert Band (Sp) Rehearsal 3 hours per week. Admission by audition and approval of the conductor. May be repeated for 99 hours.
MUEN5501 Chamber Music (Sp, Su, Fa) Performance of small ensemble music for any combination of instruments and/or voice. Rehearsal 3 hours per week. May be repeated for 99 hours.
MUEN5511 Symphonic Band (Sp) Rehearsal 3 hours per week. Admission by audition and approval of the conductor. May be repeated for 99 hours.
MUEN5521 Woodwind Quintet (Sp, Fa) Study and performance of music for woodwind quintet. Weekly coaching will emphasize intonation, blend, stylistic awareness, and ensemble precision. Repertorie ranges from the 18th to the 20th centuries. 3 hours of rehearsals weekly. May be repeated for 99 hours.
MUEN5541 Accompanying (Sp, Fa) Piano accompanying of vocal and instrumental soloists. Rehearsal 2 hours per week. Prerequisite: MUAP 110. May be repeated for 99 hours.
MUEN5551 Percussion Ensemble (Sp, Su) Study and performance of ensemble music for multiple percussion instruments. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5591 Chamber Orchestra (Sp, Su, Fa) Performance of orchestral music for a small group of instruments as opposed to large symphonic works. Rehearsal 3 hours per week. Prerequisite: concurrent enrollment in MUEN 3431 and MUEN 5431. May be repeated for 99 hours.
MUEN5711 Flute Ensemble (Sp, Fa) Study and performance of music for multiple flutes, including trios, quartets, quintets, and flute choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5721 Clarinet Ensemble (Sp, Fa) Study and performance of music for multiple clarinets, including trios, quartets, quintets, and clarinet choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5731 Saxophone Ensemble (Sp, Fa) Study and performance of music for multiple saxophones, including trios, quartets, quintets, and saxophone choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5741 Double Reed Ensemble (Sp, Fa) Study and performance of music for multiple double reed instruments, including trios, quartets, quintets, and double reed choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5751 Trumpet Ensemble (Sp, Fa) Study and performance of music for multiple trumpets, including trios, quartets, quintets, and trumpet choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5771 Trombone Ensemble (Sp, Fa) Study and performance of music for multiple trombones, including trios, quartets, quintets, and trombone choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5781 Tuba Ensemble (Sp, Fa) Study and performance of music for multiple combinations of tuba and euphonium, including trios, quartets, quintets, and low brass choir. Rehearsal 2 hours per week. May be repeated for 99 hours.
MUEN5791 University Bassoon Ensemble (Sp, Fa) Study and performance of music for multiple bassoons and contrabassoon, including trios, quartets, quintets, and bassoon choir. One hour of rehearsal weekly. May be repeated for 99 hours.

Music Theory (MUTH)

MUTH4322 Score Reading (Irregular) A conductor's approach to the technique of score reading and analysis of orchestra, band, and choral scores for the purpose of preparing composition for rehearsal and performance.
MUTH4612 Orchestration (Fa) A continuation of study of the capabilities of the various orchestral and band instruments and their use in arrangement for ensembles, band, and orchestra. Scoring for orchestra. Prerequisite: MUTH 2613.
MUTH4703 Form and Analysis (Sp) Beginning with phrase and period structure, a complete evaluation of musical form through large forms such as sonata, rondo, and theme and variation; with emphasis on characteristics of the classic and romantic schools, and analyses of select sonata movements. Prerequisite: MUTH 2613. May be repeated for 3 hours.
MUTH477VH HON SPEC TOP MUSC THEORY (Irregular) (1-4) Subject matter not covered in other courses. (Same as MUTH 477V) May be repeated for 4 hours.
MUTH477V Special Topics in Music Theory (Irregular) (1-4) Subject matter not covered in other courses. (Same as MUTH 477VH) May be repeated for 4 hours.
MUTH5343 Analytical Techniques (IR) An intensive study of selected works from music literature. Schenkerian analysis, rhythmic analysis, and set theory analytical techniques will be studied and employed in addition to traditional harmonic and formal analysis. Prerequisite: MUTH 2613 or equivalent.
MUTH5623 Pedagogy of Theory (IR) Detailed study of methods of teaching undergraduates courses in music theory and aural perception.
MUTH5631 Music Theory Teaching Practicum (Irregular) Supervised teaching of an undergraduate course in music theory or aural perception, including lesson plan and examination preparation and in-class observation.
MUTH5643 Analysis of 20th Century Music (IR) Study of 20th century music and analytic techniques including pitch class set theory and serial techniques. Prerequisite: graduate standing.
MUTH5662 Instrumental Arranging (Su) A practical course in arranging for the various small ensembles including keyboard. Review of instrumental ranges and capabilities. Study of current trends in instrumental ranges and arranging.
MUTH5672 Advanced Orchestration (Irregular) A study of advanced principles of orchestral writing through individual projects in scoring and analysis. Prerequisite: MUTH 4612 or equivalent.
MUTH568V Composition (Sp, Su, Fa) (1-4) Private lessons of one-half hour, and one hour of composition laboratory session each week. Development of skills in creative musical expression specifically for composition-theory majors - others admitted by consent. May be repeated. Prerequisite: graduate standing. May be repeated for 99 hours.
MUTH600V Master's Thesis (Sp, Su, Fa) (1-6)

Music History (MUHS)

MUHS4253 Special Topics in Music History (Sp, Fa) Topics not covered in MUHS

3703 or 3713, including history of American music, world music, music of Russia, and others. Satisfactory completion of the term paper in this class will fulfill the Fulbright College writing requirement. Prerequisite: MUHS 3703 and MUHS 3713. May be repeated for 99 hours.

MUHS4703 Survey of String Literature (Irregular) A survey of solo and chamber music literature involving stringed instruments. Prerequisite: MUAP 110 and MUTH 2613. (Same as MUHS 4703H)

MUHS4763 Survey of Vocal Literature I (Even Years, Fa) A survey of concert literature for the solo voice.

MUHS4773 Survey of Vocal Literature II (Odd years, Sp) A survey of concert literature for the solo voice. Prerequisite: MUHS 4763.

MUHS4793 Band Literature (Even years, Sp, Su, A study of literature written for performance by concert band, symphonic band, and wind ensemble, representative of the following five periods in Music History: Renaissance (1420-1600), Baroque (1600-1750), Classical (1750-1820), Romantic (1820-1900), and Contemporary (1900-present).

MUHS4803 Survey of Keyboard Literature I (Odd years, Sp, Fa) A survey of the piano works of outstanding composers. Prerequisite: MUAP 110.

MUHS4813 Survey of Keyboard Literature II (Odd years, Sp, Fa) A survey of the piano works of outstanding composers. Prerequisite: MUHS 4803.

MUHS4823 Survey of Organ Literature I (Irregular) A survey of the organ works of outstanding composers. Prerequisite: MUAP 110.

MUHS4833 Survey of Organ Literature II (Irregular) A survey of the organ works of outstanding composers. Prerequisite: MUHS 4823.

MUHS489V Seminar in Music History (Irregular) (1-4) Subject matter not covered in other courses. With, permission, may be repeated for credit if topics are different. May be repeated for 99 hours.

MUHS4963H Honors Seminar in Performing Practice (Irregular) Study of problems of performing in their historical context including media of performance; relation of notation to performance; rhythm; tempo; ornamentation; realization of improvised parts; dynamics and expression; and changing styles in music performance. Open to graduate students and to undergraduates in honors or consent of the instructor.

MUHS5722 Directed Studies in Music Literature I (Sp, Su, Fa) Research in music literature in the performance field of the individual student.

MUHS5732 Directed Studies in Music Literature II (Sp, Su, Fa) Research in music literature in the performance field of the individual student. Prerequisite: MUHS 5722.

MUHS5753 Seminar in Medieval & Early Renaissance (Irregular) Intensive studies in music of Western Europe from early Christian times through the 15th century.

MUHS5773 Seminar in Music of the 18th Century (Odd years, Sp, Su, Intensive studies of late Baroque and Classical music.

MUHS5783 Seminar in Music of the 19th Century (Odd years, Sp, Su, Intensive studies in music of the 19th century.

MUHS5793 Seminar in Music of the 20th Century (Even years, Fa) Intensive studies in 20th century music.

MUHS5903 Seminar in Musicology (Sp, Su, Fa) Current problems, techniques, and approaches to the practice of musicology, including notation and editing problems. May be repeated for 99 hours.

MUHS5943 Seminar in Opera (Sp, Su, Fa) Intensive studies in operatic literature.

MUHS5952 Choral History and Literature I (Odd years, Fa) Detailed study of choral history and literature from Gregorian chant to J.S. Bach.

MUHS5962 Choral History and Literature II (Even years, Sp) Detailed study of choral history and literature from J.S. Bach to the present.

MUHS5973 Seminar in Bibliography and Methods of Research (Sp, Su, Fa) A survey of the methods and materials of musical research, including bibliography, methods of analysis, and style in the presentation of research results. Open to graduate students and to juniors in Honors.

MUHS600V Master's Thesis (Sp, Su, Fa) (1-6)

MUHS601V Lecture-Recital (Irregular) (1-6) The production and presentation (under the direction of the teacher(s) of historic instruments involved and other members of a graduate committee) of a performance (45 minutes minimum playing time) displaying historic practices of performance with lecture. The candidate will be responsible for making an archival tape of the performance available to the library, with 2 copies of a transcript of the lecture in thesis form to be retained by the University library.

Musicology (MUSY)

MUSY5113 Proseminar: Ethnomusicology (Odd years, Fa) An introduction to ethnomusicological study with practicum in technologies for fieldwork, preservation and presentation.

MUSY5123 Proseminar: Musical Notations, Transnotation and Analysis (Even years, Sp) Principles and practices for the study and musical analysis of gestural and oral "notations", as well as standard notation, for music and dance.

MUSY5213 Proseminar: Historical Ethnomusicology (Even years, Fa) An introduction to historical ethnomusicological study with readings and discussion of seminal writings in the field.

MUSY5223 Seminar: Latin American Music (Even years, Sp) A study of the process and result of musical hybridization in South America and the Caribbean, from European colonization to the present.

MUSY5313 Proseminar: Topics in Asian and Middle Eastern Musics (Sp) Research seminars on selected topics, such as The Performing Arts in East Asia; and Music and Ritual. May be repeated. May be repeated for 6 hours.

MUSY5323 Seminar: Topics in Asian and Middle Eastern Poetry and Music (Irregular) Reading seminars on selected topics, such as Poetry and Music in Persian, Arabic and Turkish Cultures of the Islamic World; and Poetry and Song in Early East Asia. May be repeated. May be repeated for 6 hours.

MUSY5343 Seminar: Special Topics in Traditional Musics and Dance of Europe and the Americas (Irregular) Topics not covered in MUSY 5223 and MUSY 5423, including, but not limited to: European Folk Music; the musical or scholarly legacy of a particular figure.

MUSY5353 Seminar: Topics in Systematic Musicology (Irregular) Seminars on selected topics such as Musical and A-musical Grammars (requires experience in functional programming languages); and Modes, Melodies, Instruments, and Singers. May be repeated. May be repeated for 6 hours.

MUSY5363 Proseminar: Music Cognition (Sp) An exploration of recent literature concerning the mental mechanisms that underlie our ability to perceive, understand, produce, perform, and enjoy music. Introductory in nature, with readings drawn from the fields of psychology, philosophy, musicology, computer science, and neuroscience.

MUSY5371 Early Asian Music Performance Workshop (Irregular) Approaches to performing early Asian musics. Links with Summer School, the Ancient Asian Music Consort, and/or an Artist in Residence. May be repeated for 2 hours.

MUSY5383 Ethnomusicology Summer Fieldwork (Irregular) A minimum of 6 weeks summer fieldwork related to the topic of the student's thesis, resulting in an extensive fieldwork report and the submission of collected material, to be deposited in the University Library. Prerequisite: MUSY 5113.

MUSY5391 Ethnomusicology Performance Studies (Irregular) Applied vocal or instrumental studies relating to the performance activities of the International Center for Research in Early Asian and Middle Eastern Musics. (Private study, as available) May be repeated for 2 hours.

MUSY5413 Proseminar: Cross-cultural Performance Practices (Sp) A survey of performance practices from historic western art music through modern non-western music. An introductory course with readings from seventeenth- and eighteenth-century performance treatises as well as a study of written and aural traditions of non-western music.

MUSY5423 Seminar: History of Jazz (Fa) A study of the musical and cultural cross-fertilization which produced this influential twentieth-century art form, as well as a general examination of its major practitioners.

MUSY600V Ethnomusicology Thesis (Sp, Su, Fa) (1-6) Thesis requirement for the Master of Arts in Ethnomusicology program. May be repeated for 6 hours.

MUSY6313 Internship in Asian and Middle Eastern Music (Sp, Su, Fa) Internship in Asian and Middle Eastern Music Preservation in the Asian and Mid-Eastern International Music Preservation Collection, Music Division of the Library of Congress. Prerequisite: MUHS 5973 and (MUSY 5123 or MUSY 5353).

MUSY6333 Advanced studies in Ethnomusicology (Irregular) Advanced level studies, individually tailored and supervised, including Ethnomusicology (prerequisite MUSY 5113 or MUSY 5213); The Music or Dance of a Selected Area (prerequisite at least one of MUSY 5313, MUSY 5323, MUSY 5423, MUSY 5223, MUSY 5343, or HUMN 4243); Historic Performance Practices (prerequisite MUSY 5413); Historical East Asian Musicology (prerequisite MUSY 5313 or MUSY 5323); and Historical Central Asian or Middle- and Near-Eastern Musicology (prerequisite MUSY 5313 or MUSY 5323).

MUSY6363 Advanced Studies in Computer-Aided Asian Musicology (Irregular) Building a computational toolbox for research in early Asian musics. Prerequisite: MUSY 5353.

Music Pedagogy (MUPD)

MUPD477V Special Topics in Pedagogy (Irregular) (1-6) Subject matter not covered in other sources. With permission, may be repeated for credit if topics are different. May be repeated for 99 hours.

MUPD4781L Harpsichord Laboratory (Irregular) The tuning, care and repair of the harpsichord.

MUPD4863 Piano Pedagogy (Irregular) Analytical study and discussion of the various approaches to piano pedagogy and its application in individual/class instruction. Involves demonstration of principles through actual teaching of beginning, intermediate and upper level students.

MUPD5202 Voice Pedagogy I (Sp, Su, Fa) Graduate-level study of the techniques and materials of teaching voice.

MUPD582V Conducting (Sp, Su, Fa) (1-2) Private lessons of 1/2 hour and 1 hour conducting laboratory each week. Development of skills in conducting symphony, choral, opera, oratorio, ballet, and band repertoire. May be repeated for 18 hours.

MUPD584V Opera Workshop Techniques (Sp, Su, Fa) (1-2) A basic course in every phase of opera production, including staging, set design, music coaching, voice casting, and translation.

MUPD585V String Techniques (Sp, Su, Fa) (1-2) A continuation of the undergraduate courses in techniques and materials for elementary and secondary school music teaching.

MUPD586V Woodwind Techniques (Sp, Su, Fa) (1-2) A continuation of the undergraduate courses in techniques and materials for elementary and secondary school music teaching. Prerequisite: one year of similar class instruction in the field on the undergraduate level.

MUPD587V Brass Techniques (Su) (1-2) A continuation of the undergraduate class brass instrument course. Emphasis is placed on teaching methods, techniques, concepts, and materials. Prerequisite: one year of similar class instruction in the field on the undergraduate level.

MUPD591V Percussion Techniques (Sp, Su, Fa) (1-2) A continuation of the undergraduate class brass instrument course. Emphasis is placed on teaching methods, techniques, concepts, and materials. Prerequisite: one year of similar class instruction in the field on the undergraduate level.

MUPD599V Special Workshop in Music (Sp, Su, Fa) (1-6) Presented by visiting master artist-teacher in various fields of music performance, teaching and composition. Prerequisite: graduate standing. May be repeated for 6 hours.

Music Education (MUED)

MUED477V Special Topics in Music Education (Irregular) (1-4) Subject matter not covered in other sources. With permission, may be repeated for credit if topics are different. May be repeated for 99 hours.
MUED5513 Seminar: Resources in Music Education (Sp, Su, Fa) Study of the analytical and writing skills necessary for academic research in music education. Each student identifies one problem specific to music education, finds and reviews related literature and sources, develops a comprehensive bibliography, and writes a paper which synthesizes the research. Open to graduate students and undergraduates in honors in music education.
MUED5653 Seminar: Issues in Music Education (Sp, Su, Fa) A seminar exploring the relationships between the profession of teaching music and selected views about learning theories, teaching methods, philosophy, psychology, and other selected topics relevant to contemporary music education.
MUED5733 Music Education in the Elementary School (Sp, Su, Fa) Concepts of elementary music education; methods, materials, curriculum design, and supervision in elementary school music.
MUED5811 Curriculum Design in Music (Sp, Su, Fa) Goals and objectives in music education. Student will develop a curriculum for an actual or hypothetical music education program.
MUED583V Workshop: Music in the Elementary School (Sp, Su, Fa) (1-18) An in-service training workshop for elementary music teachers.
MUED5862 Marching Band Techniques (Su) Includes the place of the marching band in the school program, types of formations used, and selecting, arranging or writing the musical score.
MUED588V The Choral Program: Changing Materials and Techniques (Sp, Su, Fa) (1-3) Treatment of specific problems and issues-survey of choral literature; materials and contemporary methods appropriate to the development of a comprehensive choral experience.
MUED5973 Tests and Measurement in Music (Fa) This course will address the psychometric concepts of tests and measurement of music achievement, aptitude, attitude, and self assessment. The course will focus on the teaching and assessment of musical skills, musical responses, and will critically examine existing aptitude tests (Seashore, Watkins Farnum, Gordon, etc). Basic statistical concepts and data analysis used in common testing scenarios will be introduced. Prerequisite: graduate standing in music.
MUED5983 Psychology of Music Behavior (Sp, Even years) This course is an introduction to the psychology of music, and will adopt an interdisciplinary view toward the field, covering such topics as philosophical and sociological questions about the nature and function of music, the physiology of the ear, the physical and perceptual properties of sounds (acoustics), performance anxiety, preference and taste research, social and pedagogical attributes of performance, and behavioral musical responses. Prerequisite: graduate standing.
MUED599V Seminar (Su) (1-6) May be repeated for 6 hours.
MUED600V Master's Thesis (Irregular) (1-6) Preparation of a master's thesis as partial fulfillment of the requirement for the master's degree.
MUED605V Independent Study (Sp, Su, Fa) (1-6) Provides students with an opportunity to pursue special study of problems in music education.

NURSING, ELEANOR MANN SCHOOL OF (NURS)

Tom Kippenbrock
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- Professors Kippenbrock, Neighbors
- Associate Professors Barta, Lawson
- Assistant Professor Smith-Blair
- Instructor Buron

Degrees Conferred:
M.S. in Nursing (MSN)

The Eleanor Mann School of Nursing Graduate Program expands on the philosophy of the undergraduate nursing program and contributes to the mission of the College of Education and Health Professions and the University of Arkansas. The MSN program prepares students as Clinical Nurse Specialists (CNS) who are eligible to take national certification exams and apply for licensure as Advanced Practice Nurses. Program objectives focus on the roles of expert clinician, consultant, educator, manager, and researcher. The skills necessary for life-long learning, including self-assessment, goal setting, active learning, and research utilization are integrated throughout the curriculum. Graduates are prepared to function independently or in a collaborative role on an interdisciplinary team as change agents to affect nursing practice. Graduate education at the master's level builds on the foundation of baccalaureate education to prepare students to assume responsibility for addressing complex health needs of adults in a variety of settings. Graduates are prepared to provide clinical leadership for evidence-based practice and to contribute to the development of nursing science through practice, evaluation, and outcomes research. The faculty recognizes the uniqueness of individual students as adult learners and strives to provide flexible opportunities for learning. The Graduate Nursing Core provides students with the foundation of the science of nursing, the role of the Advanced Practice Nurse; and the complex health needs of diverse populations. The Advanced Practice Core provides students with the advanced knowledge and skills for a comprehensive approach to the management of client problems. The Clinical Nurse Specialist Core provides students with the experience and guidance in advanced clinical decision making to ensure quality care for diverse populations. The Thesis or Research Project allows students to contribute to new knowledge in nursing through original research, replication studies, dissemination efforts, and utilization projects. The Thesis or Research Project requirement also prepares graduates for further study in a doctoral program. The Nursing Education option prepares students to assume the nurse educator role in various institutional settings. The Capstone experience, a written comprehensive exam, will provide students the opportunity to demonstrate their ability to synthesize knowledge from the cores areas and communicate their ideas effectively.

Upon the completion of the program of studies the graduate will be able to:

1. Promote evidence-based practice through problem identification and the critique and utilization of research findings.
2. Collaborate in policy development, resource management, and cost-effective care delivery.
3. Apply legal/ethical principles to promote a values-based professional practice.
4. Effect health care outcomes through advanced practice roles of clinician, teacher, manager, researcher, and consultant.
5. Utilize theories from nursing and other disciplines for clinical decision making.
6. Advocate for access to quality health care for diverse populations.
7. Collaborate with other disciplines to design, deliver, and evaluate health promotion/disease prevention programs for diverse populations.

Areas of Concentration: Medical-surgical nursing; nursing education.

Primary Areas of Faculty Research: Cardiopulmonary physiology; placement, recruitment and retention of advanced practice nurses; attrition and retention of nursing students; nurse educator leadership; patient falls; self-care and health promotion in older adults; professional development.

Admission Requirements: 1) Admission to the University of Arkansas Graduate School. 2) Completion of a baccalaureate degree in nursing from an NLNAC or CCNE accredited program. 3) Current licensure to practice as a registered nurse in the state of Arkansas. 4) Completion of a basic health assessment course (academic or continuing education). 5) Completion of a basic-level statistics course with a grade of "C" or above. 6) Evidence of current CPR (American Heart Association for Professionals) certification, TB screening, Hepatitis immunization, professional liability insurance, and health insurance. 7) Basic computer and library skills including the use of electronic databases. 8) Qualified applicants will be admitted on a space available basis.

Requirements for the Master of Science in Nursing Degree: In addition to the general requirements of the Graduate School,

students must complete a minimum of 41 credits (44 credits with thesis option) including the following courses: Graduate Nursing Core courses: NURS 5003, 5013, 5023, 5033, 5042, 5141; Advanced Practice Core courses: NURS 5143, 5102, 5111, 5123; Clinical Specialist Core courses: NURS 5212, 5225, 5232, 5245. Clinical practicum courses involve 3 contact hours per credit. Students complete a total of 540 hours of clinical practicum. Students who select the thesis option complete a minimum of six credits of thesis that will count toward the degree. As an alternative to completing a thesis, students may elect the research project option and are required to complete a three-credit independent study. Students who intend to pursue doctoral preparation are strongly urged to select the thesis option. All candidates for the Master of Science in Nursing (MSN) must successfully complete a comprehensive written exam.

The Nursing Education option is available to students currently enrolled in the MSN program and to those nurses with a previous master's degree in nursing. Students complete nine credits by taking the following courses: NURS 5303, 5313, 5323.

Arkansas State Board of Nursing approved.
Accreditation of the program will be pursued prior to the first graduating class.

Nursing (NURS)

NURS5003 Theorectical Foundations in Nursing (Odd Years, Fa) The course utilizes the critical reasoning process to examine the element of nursing knowledge. Emphasis is placed on concept analysis and the evaluation of nursing theories. Identification of the links between theory and empirical indicators is examined. The clinical relevance of mid-range and practice theories is explored.

NURS5013 Advanced Nursing Research I (Odd Years, Fa) This course foceses on scientific approaches to the knowledge, logic, and techniques of the research process. Reciprocal relationships among theory, research, ethics, and evidence based nursing practice are emphasized. Pre- or Corequisite: NURS 5003.

NURS5023 Advanced Nursing Research II (Even Years, Sp) Builds on the content of Advanced Nursing Research I. Focuses on specific research methodologies, statistical analysis, and interpretation of findings. Emphasis is placed on critical analysis of nursing research outcomes for support of evidence-based practice. Syntheses of the two course sequence results in completion of a research proposal. Prerequisite: NURS 5013.

NURS5033 Role Development of the Advanced Practice Clinical Nurse Specialist (Even Years, Sp) The study of role development of the Advanced Practice Nurse with specific emphasis on the role of the Clinical Nurse Specialist (CNS). Concepts include role development, interdisciplinary communication and collaborative strategies, patient advocacy and serving as change agent for role implementation. Pre- or Corequisite: NURS 5003.

NURS5042 Advanced Concepts in Health Promotion with Diverse Populations (Even Years, Sp) Provides a theoretical basis for health promotion, risk reduction and disease prevention at the individual, family and community levels. A cross-disciplinary approach to achieve or preserve health is identified. Focuses on holistic plans and interventions that address the behavioral and social factors that contribute to morbidity and mortality in diverse populations.

NURS5102 Advanced Health Assessment (Even Years, Su) Application of advanced health assessment techniques with adults within the context of the family and community. Differentiate abnormal from normal findings, interpret diagnostic tests, and use clinical reasoning to formulate diagnoses for culturally diverse individuals. Emphasis on health promotion and disease prevention. Corequisite: NURS 5111.

NURS5111 Clinical Practicum: Advanced Health Asessment (Even Years, Su) Clinical practicum companion course for NURS 5102: Advanced Health Asessment. Opportunities to conduct health assessments on a variety of clients. Corequisite: NURS 5102.

NURS5123 Advanced Pharmacology (Even Years, Su) Advanced concepts and application of pharmacotherapeutic and pharmacokinetics of broad categories of agents used for disease management of individuals. Provides the student with the knowledge and skills to manage (including the prescription of pharmacologic agents) a client's common health problems in a safe, high quality, cost-effective manner.

NURS5141 Clinical Practicum: Advanced Concepts in Health Promotion with Diverse Populations (Even Years, Sp) Clinical practicum companion course for NURS 5042. Provides opportunity to develop, implement, and evaluate health promotion interventions for selected clients. Corequisite: NURS 5042.

NURS5143 Advanced Pathophysiology (Odd Years, Fa) This course is designed for nurses experienced in the management of pathophysiological disorders. It includes mechanisms of disease, the immune response and selected system based disorders.

NURS5212 Advanced Medical-Surgical Nursing I (odd Years, Sp) Focuses on utilization of advanced theories, concepts, knowledge and skill in the care of diverse adult populations with complex acute health problems. Prerequisite: all core courses.

NURS5225 Clinical Practicum: Advanced Medical-Surgical Nursing I (Odd Years, Sp) Clinical practicum for NURS 5212. Application of advanced theories, concepts, knowledge and skill in the care of diverse adult populations with complex acute health problems. Corequisite: NURS 5212. Prerequisite: all core courses.

NURS5232 Advanced Medical-Surgical Nursing II (Even Years, Fa) Focuses on utilization of advanced theories, concepts, knowledge and skill in the care of diverse adult populations with complex chronic health problems. Corequisite: NURS 5245. Prerequisite: all core courses.

NURS5245 Clinical Practicum: Advanced Medical-Surgical Nursing II (Even Years, Fa) Clinical practicum for NURS 5232. Application of advanced theories, concepts, knowledge and skill in the care of adults with chronic health problems. Corequisite: NURS 5232. Prerequisite: all core courses.

NURS5303 Foundations of Nursing Education (Odd Years, Fa) Considers the principles, philosophies, theories, and strategies of teaching, learning, and evaluation needed in nursing education.

NURS5313 Curriculum and Evaluation in Nursing Education (Even Years, Sp and Su) Considers knowledge and skills needed for curriculum and program development and evaluation for a variety of nursing eduation settings.

NURS5323 Teaching in Nursing Practicum (Even Years, Sp) Supervised experience in the nurse educator role in both classroom and clinical settings.

NURS579V Independent Study (Even Years, Fa) (1-3) Independent study designed by student with faculty advisor. May be completed as alternative to thesis.

NURS589V Workshop (Irregular) (1-3) Practice-based topics for the advanced practice nurse.

NURS599V Seminar (Irregular) (1-3) Selected topics in nursing explored in discussion format.

NURS600V Master's Thesis (Even Years, Fa) (1-3) Student research to fulfill degree requirement for the MSN. Prerequisite: NURS 5013 and NURS 5023.

OPERATIONS MANAGEMENT (OPMG)

Also offered through Graduate Resident Centers

Sandra Parker
Chair of Studies
4207 Bell Engineering Center
479-575-7426

E-mail: ncsloan@uark.edu

Web: http://www.opnsmgmt.uark.edu/

- Professors English, Parker
- Visiting Assistant Professors Bailey, Berthelot, Carmichael, Collier, Daniell, Davis, DeBurra, DelCastillo, DeWitt, Dhodapkar, Donaldson, Donatelli, Ellixson, Garner, Hurd, Maksi, Martin, McCaa, Miller, Moores, Myers, Nethercutt, Noland, O'Neal, Rasmussen, Ray, Roy, Sandsmark, Sloan, Teague, Ton, Vash, Wilke, Yeager, Zilinsky

Degree Conferred:

M.S.O.M. (OPMG)

The Master of Science in Operations Management program is directed toward the acquisition of practical knowledge in the areas of project planning, quality assurance, safety management, inventory techniques, and human factors analysis.

The operations management program is operated at Graduate Residence Centers in Arkansas, Tennessee, and Florida, as well as at Fayetteville. Evening classes are offered in eight-week terms, five terms an academic year. Selected courses are available by video and Internet. The operations management curriculum is aimed at the needs of both military and civilian working managers of technical and logistics operations, regardless of the major they selected as an undergraduate student. The subject matter is patterned after the industrial engineering curriculum but is less technical and does not require a calculus mathematics background.

Before students complete more than 12 hours of course work toward the operations management degree, they must successfully complete the following courses (or equivalent courses or demonstrate knowledge of subject areas):

OMGT 4313 Law and Ethics
OMGT 4323 Industrial Cost Analysis

OMGT 4333 Applied Statistics
OMGT 4853 Data Processing Systems

These courses are offered at the undergraduate level and cannot be applied toward the requirements for a Master of Science in Operations Management degree.

To fulfill requirements for the M.S.O.M. degree, a student must earn a total of 30 semester hours credit in the program. Upon approval of the program director, students may take up to six thesis hours to be applied toward the 30 semester hours required for degree completion. The six hours of thesis must be completed on the Fayetteville campus.

Operations Management (OMGT)

OMGT4223 Occupational Safety and Health Standards (Sp) Survey of existing and proposed standards by examining fundamental physical, economic, and legal bases. Performance vs. specific standards. Enforceability and data collection. National consensus and promulgation process. Includes a design project using a computer. (Same as INEG 4223)

OMGT4303 Industrial Safety Administration (Irregular) Principles of accident and industrial disease prevention; organization and operation of industrial safety and hygiene programs; conformance with federal occupational safety and health regulations.

OMGT4373 Quality Engineering and Management (Irregular) Provides the student with complete coverage of the functional area of "Quality Assurance"; ranging from the need for such a function, how it works, techniques utilized, and managerial approaches for insuring its effectiveness. Prerequisite: INEG 3313.

OMGT4523 Automated Production (Irregular) Industrial robots and robot programming, industrial logic control systems, programmable controllers for the control of work stations, and conveyor systems. On-line computer and microprocessors. Group technology, flexible manufacturing systems, and computer-integrated manufacturing laboratory required.

OMGT4553 Production Planning and Control (Sp) Operational problems of production systems including control of purchased materials inventory; scheduling of a job shop, batch, and continuous production process for single and multi-item product lines; planning of work force and inventory under seasonal and stochastic demand.

OMGT4583 Operations Productivity and Automation (Irregular) An examination of methods to improve industrial productivity including quality circles, robots, machine vision, programmable controllers, computer numerical control, and computer-assisted manufacturing.

OMGT4613 Production and Inventory Control (Irregular) Operational problems of production systems including control of purchased materials; scheduling of job shop, batch, and continuous production processes; planning of work force and production under seasonal demand. Inventory models and strategies are compared.

OMGT4623 Strategic Management (Irregular) Case studies covering the spectrum of strategic management issues facing typical organizations. Designed to provide analysis and synthesis experience to apply principles of operations management. Should be taken in last half of degree program

OMGT4783 Project Analysis and Control (Irregular) Introduction to the Critical Path Method and Program Evaluation and Review Technique. Project planning and control methods; activity sequencing; time-cost trade-offs; allocation of manpower and equipment resources; scheduling activities; computer systems for PERT/CPM.

OMGT4853 Data Processing Systems (Sp, Su, Fa) Fundamentals of computers and data processing. Computer hardware and software. Word processing and spreadsheet methods and applications. Introduction to database concepts and applications.

OMGT4873 Principles of Operations Research (Irregular) Surveys the mathematical models used to design and analyze operational systems. Contents include linear programming models, waiting line models, and management science. Applications of operations research are emphasized.

OMGT5003 Introduction to Operations Management (Sp, Su, Fa) An overview of the functional areas of Operations Management. Each class will consist of a capsule of the topics covered in other courses in depth. Guest lectures. Required course for all majors in Operations Management.

OMGT5013 Supply Chain Management for Operations Managers (Irregular) This course focuses on the planning, organizing, controlling and management of supply chain activities, including transportation, inventory maintenance, order processing, purchasing, warehousing, materials handling, customer service standards, and production. Emphasizes synthesis of the concepts, principles, and methods prevalent in marketing, production, accounting, purchasing, transportation, and multi-firm logistics planning for operations managers.

OMGT5113 Human Resource Management (Irregular) Human resource policies and practices are examined including legal foundations, classification and compensation plans, recruitment and selection processes, training, employment policies and morale, compensation, employee relations, and organization.

OMGT5123 Finance for Operations Managers (Irregular) The scope and environment of finance for operations managers, including financial markets, interest rates, financial statements, cash flows, and performance evaluation; valuation of financial assets using time value of money and meaning and measurement of risk and return; capital-budgeting, cost of capital, capital structure, and dividend policy.

OMGT5133 Operations Management i the Service Sector (Irregular) Review of the role of the operations management in the service sector, e.g., health care systems, banking, municipal services, utilities, and postal service and others. Emphasizes the principles and methodologies applicable to the solution of problems within the service industries. Prerequisite: graduate standing.

OMGT5143 Contemporary Issues in Human Resource Management (Irregular) Emerging issues affecting employee well-being and workforce productivity. Impact of such issues as diversity, job evaluation, compensation, incentive pay, retention, and the aging workforce. Legal aspects of FMLA, EAP, and ADA are included. Students will develop a wage survey and an action plan to implement into an organization.

OMGT5223 Safety and Health Standards Research (Irregular) For graduate students who seek Certified Professional or Certified Industrial Hygienist status, or both. Includes review and development of computer databases for standards, interpretations, court decisions, and field memoranda. Test equipment and procedures for determining indoor industrial aid containment PEL concentrations and industrial environment noise levels are examined. Prerequisite: INEG 4223 or OMGT 4303. (Same as INEG 5223)

OMGT5303 Health Care Policies and Issues (Irregular) Health care management and policy development. Health insurance, Medicare and managed care. Health benefits for employees. The role of government and business in policy formulation. Financing of health care. Legal and ethical considerations in health care. Hospital and outpatient management issues.

OMGT5373 Quality Management (Irregular) Implementation of modern participative quality management techniques in military and civilian operations. Includes quality control methods and control charts. Acceptance sampling plans with emphasis upon Department of Defense procurement standards.

OMGT5423 Operations Management & Global Competition (Sp) Studies of principles and cases in business/industrial administration in global competition. Survey of markets, technologies, multi-national corporations, cultures, and customs. Discussion of ethics, professionalism, difference valuing, human relations skills, and other topics relevant to global engineering practice. Prerequisite: INEG 4433.

OMGT5433 Cost Estimation Models (Irregular) An examination of the methodologies for estimating and forecasting manufacturing costs. Types of cost recovery systems, work progress functions, product improvement curves, determination of hourly rates, parametric estimating systems, and the development of software for computer-assisted estimating systems. Prerequisite: INEG 3513 and INEG 3833. (Same as INEG 5433)

OMGT5463 Economic Decision Making (Irregular) Principles of economic analysis with emphasis upon discounted cash flow criteria for decision making. Comparison of criteria such as rate of return, annual cost, and present worth for the evaluation of project alternatives.

OMGT5503 Maintenance Management (Irregular) Principles and practices of maintenance department organization, prevention procedures, and typical equipment problems. Includes related topics such as plant protection, preventative and plant maintenance.

OMGT5733 Human Factors Analysis (Irregular) Psychological and physiological factors to be considered by the operations manager. Human perceptual and work capacities are examined in relation to various task situations, with emphasis on controlling and monitoring tasks. Fundamental design factors are also considered. Human behavioral aspects of management decisions are considered.

OMGT577V Special Problems (Irregular) (1-3) Application of previous course work knowledge to problems encountered in military base and civilian operations. Problems are proposed by students according to individual interests and needs.

OMGT5823 Computer Applications (Irregular) Computer systems for analysis and control of operations management problems. Coding of operations models and currently available software systems. Microcomputers, minicomputers, and time-sharing systems. Networking and navigating the Internet as a resource for solving operations management problems.

OMGT5873 Organization and Control (Irregular) Examination of organizational decision making authority, structures, and controls. Functions of management-planning, organizing, staffing, directing, and controlling. Comparison of military and civilian environments for the implementation of management principles.

OMGT600V Masters Thesis (Irregular) (1-6)

OPERATIONS RESEARCH (ORES)

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- Distinguished Professor White
- Professors English, Johnson, Meller
- Associate Professors Cassady, Fant, Mason, Nachtmann, Pohl, Rossetti
- Adjunct Associate Professor Gattis
- Assistant Professors Buyurgan, Chimka, Nam

Degree Conferred:

M.S.O.R. (ORES)

The Department of Industrial Engineering offers a graduate program leading to the Master of Science in Operations Research (M.S.O.R.) for engineering, science, and other non-engineering graduates. Candidates for the degree must possess or obtain mathematical training through multivariate calculus, knowledge of probability theory and statistics, and either linear algebra or undergraduate operations research. Minors in the areas of mathematics, computer science, and statistics are also available under the program.

Areas of Research Activity: A critical component of all graduate-level work is scholarly activity through the completion of substantive research. These activities take place through the completion of master's research projects, master's theses, and doctoral dissertations. The department encourages the completion of master's theses, particularly for those students holding assistantship appointments.

Research areas of concentration at both the master's and doctoral levels include the following: artificial intelligence/expert systems; computer-assisted processes; computer-integrated manufacturing; financial engineering; engineering administration; facilities analysis/design; human factors/ergonomics; manufacturing automation/robotics; material handling; operations research; productivity measurement/analysis; production control/scheduling; and quality control/reliability

Primary Areas of Faculty Research: Automation and robotics; economic decision analysis; electronics manufacturing; engineering and quality management; ergonomics, human factors, and safety; manufacturing and transportation logistics; material handling and warehousing systems; operations research; quality, reliability, and maintainability; and scheduling.

Prerequisites to the M.S.O.R. Degree Program:

1. There are no prerequisites for students with an undergraduate degree from an ABET-accredited industrial engineering program.
2. For students with a degree other than an ABET-accredited industrial engineering degree, a number of prerequisite courses are required. These are presented in a departmental manual for graduate students that should be obtained by all students entering programs at the graduate level. The graduate handbook is available online at the Industrial Engineering Web site listed above.

Requirements for the Master of Science in Operations Research Degree: In addition to the requirements of the Graduate School and the College of Engineering, the following program requirements must be satisfied by candidates for the M.S.O.R. degree.

1. All candidates for the Master of Science in Operations Research degree (M.S.O.R.) must successfully complete three core courses: a) INEG 5313 Probability Theory and Stochastic Processes; b) INEG 5613 Optimization Theory I; and c) INEG 5823 Systems Simulation.
2. Candidates for a Master of Science in Operations Research degree (M.S.O.R.) who present a thesis are required to complete a minimum of 24 semester hours of course work and six semester hours of thesis.
3. Candidates for the degree who present a project are required to complete 27 semester hours of course work and three hours credit for INEG 513V Master's Research Project and Report.
4. Candidates for the degree who do not present either a thesis or project are required to complete 30 semester hours of course work.
5. All candidates must successfully complete a master's oral examination that is conducted by the candidate's faculty committee.
6. Attendance at INEG graduate seminar is required of all graduate students in industrial engineering.

Course listings and descriptions may be found under Industrial Engineering.

PHILOSOPHY (PHIL)

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- Professor Spellman
- Associate Professors Adler, Lee, Minar, Senor
- Assistant Professors Funkhouser, Lyons, McMullin, Ward

Degrees Conferred:

M.A., Ph.D. (PHIL)

Areas of Concentration: History of philosophy (including ancient, medieval, modern, and contemporary), metaphysics, epistemology, ethics, social and political philosophy, philosophy of language, philosophy of mind, philosophy of religion, and philosophy of science.

Prerequisites to Degree Program: Admission to the program is subject to the approval of the graduate committee of the Department of Philosophy. For the M.A., the normal expectation is 18 hours in philosophy, including logic. Students with fewer hours in philosophy may be admitted with deficiencies. In addition to the materials required by the Graduate School, at least two letters of recommendation, a sample of written work, and GRE aptitude scores (if available) should be submitted to the department chair. For the Ph.D., completion of an M.A. degree in philosophy is required.

Requirements for the Master of Arts Degree: (Min. 33 hours.)

1. 27 total hours of course work with a cumulative GPA of 3.00 or better. These hours must include:
   a. Satisfaction of the course distribution requirement, which is as follows: one course each in ancient Greek philosophy, modern philosophy, one history of philosophy course in an area other than ancient Greek and modern philosophy, value theory, and metaphysics/epistemology. Only courses in which the student earns a grade of "B" or better will count towards fulfilling the course distribution requirement. A student may petition the graduate committee to take an exam in one or more of the above areas, which, if passed, would satisfy the distribution requirement for the area(s) in question.
   b. Symbolic Logic I or II with a grade of "C" or better, or equivalent, or exam in symbolic logic.
   c. Six hours of course work in graduate seminars.
2. An acceptable thesis and a successful oral comprehensive examination before the thesis committee. With the approval of the graduate committee, the comprehensive exam may be taken a second time.

Requirements for the Doctor of Philosophy Degree:

1. 24 hours of course work beyond completion of the M.A. in philosophy (with the approval of the graduate committee, up to six hours may be taken in another discipline). Course work beyond the M.A. must satisfy the following conditions:
   a. The cumulative GPA must be 3.00 or better.
   b. Only courses in which a "B" or better is earned count toward the 24 hours of course work required for the Ph.D.
   c. Symbolic Logic I or II, or equivalent, or exam in symbolic logic. (This requirement is waived for candidates who have completed the above M.A. program.)
   d. At least nine hours of graduate seminar work in philosophy.

2. Reading knowledge of one scholarly language in addition to English. Languages other than French, German, Latin, and classical Greek must be approved by the graduate committee of the Department of Philosophy.
3. Four comprehensive exams must be taken and passed – one in each of the following: ancient Greek philosophy, modern philosophy, ethics, and one other area of philosophy. With approval of the graduate committee, exams may be taken a second time.
4. An acceptable dissertation, successfully defended before the dissertation committee.

Through an agreement with the Academic Common Market, residents of certain Southern states may qualify for graduate enrollment in the doctoral program in philosophy as in-state students for fee purposes. See page 237 for details.

Philosophy (PHIL)

PHIL4003 Ancient Greek Philosophy (Fa) Pre-Socratics, Socrates, Plato, and Aristotle. Prerequisite: 3 hours of philosophy.
PHIL4013 Platonism & Origin of Christian Theology (Sp) The study of Plato, Middle Platonism, and Neoplatonism, including Philo, Plotinus, and Proclus, and the influence of Platonism on the Greek church fathers of the 2nd-5th centuries, principally Origen and Gregory of Nyssa and also Psuedo-Dionysius. Prerequisite: 3 hours of philosophy.
PHIL4023 Medieval Philosophy (Fa) Includes Augustine, Bonventure, Aquinas, Scotus, and Ockham.
PHIL4033 Modern Philosophy-17th and 18th Centuries (Sp) British and Continental philosophy, including Bacon, Descartes, Spinoza, Liebniz, Hobbes, Locke, Berkeley, Hume, and Kant.
PHIL4043 Nineteenth Century Continental Philosophy (Fa) Study of major Continental European philosophers of the 19th century including Hegel, Marx, Kierkegaard, Schopenhauer, Nietzsche. Emphasis on the nature of persons, the question of freedom, and the importance of self-expression, as well as views on knowledge, reality, and the nature of philosophy. Prerequisite: 3 hours of Philosophy.
PHIL4063 Twentieth Century Continental Philosophy (Sp) Study of major figures (e.g. Husserl, Heidegger, Sartre, Foucault, Derrida) and trends (phenomenology, existentialism, hermeneutics, critical theory, deconstruction) in 20th century French and German thought. Topics include human beings and their place in the world, the role of history and culture, and the possibility of critical reflection.
PHIL4073 History of Analytic Philosophy (Sp) From Frege to recent figures, including Russell, Moore, Wittgenstein, Schlick, Carnep, Ayer, Ryle, Strawson, Quine, including a representative sample of works on the logical analysis of language, logical positivism, and ordinary language analysis. Prerequisite: 3 hours of philosophy.
PHIL4083 Existentialism (Sp) Readings in major figures associated with "Existentialism" (e.g. Kierkegaard, Nietzsche, Heidegger, Sartre, Merleau-Ponty). Emphasis on connections between the metaphysical views of these thinkers, their views of freedom, their conceptions of modernity, and their responses to it.
PHIL4093 Special Topics in Philosophy (Irregular) This course will cover subject matter not covered in regularly offered courses. May be repeated twice for a maximum of 6 hours of credit, as content will vary. May be repeated for 6 hours.
PHIL4113 Social and Political Philosophy (Sp) Selected philosophical theories of society, the state, social justice, and their connections with individuals.
PHIL4123 Classical Ethical Theory (Fa) Study of classical texts in the history of philosophical ethics from Plato to Nietzsche. Philosophers covered may include Plato, Aristotle, Butler, Hume, Kant, and Mill. Prerequisite: 3 hours of philosophy.
PHIL4133 Contemporary Ethical Theory (Fa) A study of contemporary texts in philosophical ethics from G.E. Moore to the present. Philosophers covered may include Moore, Stevenson, Hare, Foot, and Rawls. Prerequisite: 3 hours of philosophy.
PHIL4143 Philosophy of Law (Sp) A philosophical consideration of the nature of law, theory of adjudication, concepts of legal responsibility, liberty and the limits of law, and selected moral-legal issues (abortion, affirmative action, punishment, etc.).
PHIL4203 Theory of Knowledge (Fa) An examination of skepticism, the nature and structures of knowledge and epistemic justification, human rationality, and the justification of religious belief. Prerequisite: 3 hours of philosophy.
PHIL4213 Philosophy of Science (Fa) Examination of issues related to scientific explanation, empirical foundations of science, observation and objectivity, nature of laws and theories, realism and instrumentalism, induction and confirmation, models, causation, and simplicity, beginning with historical survey set in the context of the history of science but emphasizing works from the 1930s to the current period, often including issues in recent physics.
PHIL4233 Philosophy of Language (Sp) A survey of mainstream philosophical theories of meaning, reference, truth, and logical form. Attention given to the views of such figures as Frege, Russell, Tarski, Searie, Dumett, and the advocates of possible worlds semantics.
PHIL4253 Symbolic Logic I (Fa) Rigorous analyses of the concepts of proof, consistency, equivalence, validity, implication, and truth. Full coverage of truth-functional logic and quantification theory (predicate calculus). Discussion of the nature and limits of mechanical procedures (algorithms) for proving theorems in logic and mathematics. Informal accounts of the basic facts about infinite sets. (Same as MATH 4253)
PHIL4263 Symbolic Logic II (Sp) Topics include: soundness and completeness of propositional logic, soundness and completeness of quantification theory, the elements of model theory and recursion theory, G˝del's incompleteness theorems, and the limitative theorems of Tarski and Church. Prerequisite: PHIL 4253 or MATH 4253. (Same as MATH 4263)
PHIL4303 Philosophy of Religion (Sp) Types of religious belief and critical examination of their possible validity, including traditional arguments and contemporary questions of meaning.
PHIL4403 Philosophy of Art (Sp) Varieties of truth and value in the arts and aesthetic experience, focusing on the creative process in the art and in other human activities.
PHIL4423 Philosophy of Mind (Sp) An examination of such topics such as the relationship between mind and body, the mentality of machines, knowledge of other minds, the nature of psychological explanation, the relationships between psychology and the other sciences, mental representation, the nature of the self, and free will and determinism.
PHIL4603 Metaphysics (Irregular) Theory and critical analysis of such basic metaphysical problems as mind and body, universals and particulars, space and time, determinism and free will, self-identity and individualism, with emphasis on contemporary perspectives. Prerequisite: 3 hours of philosophy.
PHIL5763 Seminar: Aquinas (Irregular)
PHIL5823 Seminar: Spinoza (Irregular)
PHIL5843 Seminar: Hume (Irregular)
PHIL5883 Seminar: Wittgenstein (Irregular)
PHIL5893 Seminar: Heidegger (Irregular)
PHIL5903 Seminar: Social & Political Philosophy (Irregular)
PHIL5913 Seminar: Ethical Theory (Irregular)
PHIL5933 Seminar: Philosophical Theology (Irregular)
PHIL5953 Seminar: Philosophy of Language (Irregular)
PHIL5963 Seminar: Philosophy of Mind (Irregular)
PHIL5973 Seminar: Metaphysics (Irregular)
PHIL5983 Philosophical Seminar (Irregular) Various topics and issues in historical and contemporary philosophy. May be repeated for 3 hours.
PHIL600V Master's Thesis (Sp, Su, Fa) (1-6)
PHIL690V Graduate Readings (Sp, Su, Fa) (1-6) Supervised individual readings in historical and contemporary philosophy.
PHIL700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

PHYSICAL EDUCATION (PHED)

Sharon Hunt
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Degrees Conferred:

M.A.T., M.Ed. (PHED)

The Master of Arts in Teaching (M.A.T.) degree program is a 33-semester-hour degree program offered in consecutive fall and spring semesters. Initial enrollment will be only in the fall semester. The M.A.T. degree is the initial teaching certification program for students at the University of Arkansas.

Areas of Concentration for the M.A.T.: Agricultural education, childhood education, middle-level education, physical education, secondary education, and vocational education.

Prerequisites to M.A.T. Degree Program: Students will be selected up to the maximum number designated for each cohort area of emphasis. Admission requirements for the M.A.T. degree program for initial certification are as follows:

1. Completion of an appropriate undergraduate degree program
2. Cumulative GPA of 2.70 in all previous courses
3. Admission to the Graduate School
4. Admission to Teacher Education Program
5. Completion of the pre-education core with a minimum of "C" in all courses
6. Completion of all prerequisite courses in teaching field
7. Payment of internship fee.

Requirements for the Master of Arts in Teaching Degree in Physical Education: (Minimum 33 hours.)

Required M.A.T. Core: 10 hours
CIED 5012 Measurement/Research/Statistical Concepts for Teachers
CIED 5032 Curriculum Design Concepts for Teachers
CIED 5042 Reading and Writing across the Curriculum
CIED 5052 Seminar: Multicultural Issues
ETEC 5062 Teaching and Learning with Computer Based Technologies

Remaining Required for Concentration in Physical Education: (23 hours.)
PHED 5011L Measurement/Research/Statistics Lab
PHED 5023 Class Management
PHED 5031L Curriculum Design Lab
PHED 5233 Research on Teaching in Physical Education
PHED 5273 Critical Analysis of Professional Issues
KINS 5643 Motor Learning
PHED 5793 Effective Teaching in Physical Education
PHED 507V Cohort Teaching Internship (6 hours)

Areas of Concentration for the M.Ed.: Teaching physical education, teaching adapted physical education.

Prerequisites to the M.Ed. Degree Program: For acceptance to the master's degree program in physical education, the program area stipulates, in addition to the general requirements of the Graduate School, an undergraduate degree in physical education or in a related field. Additional prerequisites may be prescribed by the program area.

Requirements for the Master's of Education Degree: Candidates for the master's degree in physical education must complete 27 semester hours of graduate work and a thesis or 33 semester hours without a thesis. In addition to the program requirements listed below, all candidates must successfully complete a written comprehensive examination.

Teaching Physical Education: (33 hours)
Required Research Component (6)
EDFD 5393, Statistics in Education and Health Professions OR
EDFD 6403, Educational Statistics and Data Processing Applied to Education
HKRD 5353, Research in HKRD

Education Core
Learning/Development Domain (3)
EDFD 5373, Psychological Foundations of Teaching and Learning
EDFD 5473, Adolescent Psychology in Education
EDFD 5573, Life-Span and Human Development
History/Philosophy Domain (3)
EDFD 5303, Historical Foundations of Modern Education
EDFD 5323, Global Education
EDFD 5353, Philosophy of Education

Program Core Courses (12)
PHED 5213, Philosophical Foundations
PHED 5233, Research on Teaching in PE
HKRD 5373, Problems in HKRD
PHED 5253, The PE Program

Approved Electives (9)

Teaching Adapted Physical Education (33 hours)
Required Research Component (6)
EDFD 5393, Statistics in Education and Health Professions, OR
EDFD 6403, Educational Statistics and Data Processing Applied to Education
HKRD 5353, Research in HKRD

Education Core
Learning/Development Domain (3)
EDFD 5373, Psychological Foundations of Teaching and Learning
EDFD 5473, Adolescent Psychology in Education
EDFD 5573, Life-Span and Human Development
History/Philosophy Domain (3)
EDFD 5303, Historical Foundations of Modern Education
EDFD 5323, Global Education
EDFD 5353, Philosophy of Education

Required Courses (12)
HKRD 5373, Problems in HKRD
PHED 5413, Adapted Physical Education
KINS 5423, Assessment and Prescriptive Programming in Adapted Kinesiology
KINS 5493, Practicum in Adapted PE

Approved Electives (9)

Physical Education (PHED)

PHED5011L Measurement/Research/Statistics Laboratory (Fa) Cohort 5th year course. Application of content, principles, and concepts needed to become an effective evaluator/ researcher in kinesiology.
PHED5023 Class Management (Fa) Cohort 5th year course that emphasizes class management; includes professional ethics and school policies related to students, faculty and programs. A major part of course time will be field based.
PHED5031L Curriculum Design Laboratory (Sp) This cohort 5th year course reviews curriculum models unique to physical education program; application of general principles of curriculum design and specific models as used in selected public school settings. Corequisite: CIED 5032.
PHED507V Cohort Teaching Internship (Sp, Fa) (1-6) May be repeated for 6 hours.
PHED5213 Philosophical Foundation (Irregular) Presentation of philosophical approaches to the student of physical education and human movement phenomena. Special attention is given the development of qualitative approaches enabling students to examine problematic issues and practices in physical education, sport, and other movement forms.
PHED5233 Research on Teaching in Physical Education (Fa) A review of contemporary research literature informing effective teaching practices in physical education settings. Students gain experience in critically reviewing literature in physical education as well as related behavioral science, education, and humanities disciplines; emphasis is placed in incorporating research finding into personal teaching strategies.
PHED5253 The Physical Education Program (Irregular) Principles, problems, procedures, and the influence of educational philosophy on programs in physical education and their application in the construction of a course of study for a specific situation.
PHED5263 Movement Education in the Elementary School Program (Irregular) Movement concepts applied to the elementary school physical education program. Considers movement exploration techniques, locomotor, nonlocomotor, and manipulative skills.
PHED5273 Critical Analysis of Professional Issues (Sp) A review of contemporary research literature informing effective teaching practices in physical education settings. Students gain experience in critically reviewing literature and discussing current issues. Corequisite: M.A.T cohort.
PHED5383 Movement Experiences for Elementary School Children (Irregular) This cohort 5th year course includes taxonomies of physical education, descriptive techniques of teaching effectiveness and of student behavior, evaluation of elementary level programs and students, and field trips to selected public schools.
PHED5413 Adapted Physical Education (Fa) Methods, techniques and special groups of physical education for the atypical child.
PHED560V Workshop (Sp, Su, Fa) (1-3) May be repeated for 3 hours.
PHED5693 Practicum in Teaching (Irregular) Scheduled practical field experience applying knowledge gained in PHED 5011 (Meas/Research/Stat Lab), PHED 5031 (Curr. Lab), and KINS 5643 (Motor Learning).
PHED574V Internship (Sp, Su, Fa) (1-6)
PHED5793 Effective Teaching in Physical Education (Fa) This cohort fifth-year course focuses on the skills necessary to develop and maintain an effective physical education learning environment. Special attention is given to the development of effective units of instruction throughout the K-12 curriculum. Corequisite: M.A.T. cohort.
PHED6353 Systematic observation Research in Physical Education (Sp) This course will help students understand systematic observation as a tool for studying teaching, coaching, learning; to develop skills in systematic observation techniques; and to collect data on behaviors in physical education and sport.
PHED6363 Supervision in Physical Education (Sp) The focus of this course is instructional supervision as a set of complex processes in which the supervisor works within accepted guidelines and functions to effectively supervise a teacher's pedagogical development. The Physical Education Instructional Supervision (PEIS) Model will be used to help facilitate this process.

PHYSICAL SCIENCE (PHSC)

Lothar Schäfer
Chair of Studies
218 Chemistry Building
479-575-4601

Physical Science (PHSC)

PHSC5003 Higher Order Thinking in Science (Sp, Su, Fa) Laboratory approach to teaching science as integrated, constructive processes involving experimentation, investigation, communication, reasoning, and problem solving. Subject foundation show connections and applications in life, earth, and physical systems. Training to improve content learning, learning environments, and the use of manipulatives, calculators, and science equipment.

PHYSICS (PHYS)

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Rajendra Gupta
Chair, Graduate Affairs Committee
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- Distinguished Professors Salamo, Xiao
- Professors Bellaiche, Gea-Banacloche, Gupta, Harter, Lacy, Lieber, Pederson, Singh, Thibado, Vyas
- Adjunct Professor Naseem
- Research Professor Vickers
- Associate Professors Oliver, Stewart (G.)
- Assistant Professors Chakhalian, Gross, Li, Fu
- Visiting Assistant Professors Kennefick (D.), Kennefick (J.), Stewart (J.)
- Adjunct Assistant Professor Schultz

Degrees Conferred:

M.S. in Applied Physics (APHY)
M.A., M.S., Ph.D. (PHYS)

Primary Areas of Faculty Research: Atomic and molecular physics; biophysics; condensed matter physics; laser physics; nanoscience; physics education; quantum optical physics; space and planetary sciences; surface physics; and theoretical physics.

Prerequisites to M.S. and Ph.D. Degree Programs: Prospective students must satisfy the requirements of the Graduate School as described in this catalog and have the approval of the Graduate Admissions Committee of the Department of Physics. In addition, to be admitted to graduate study in physics without deficiency, candidates should have an undergraduate degree with the equivalent of a 30-hour major in physics including intermediate-level courses in mechanics, electricity and magnetism, quantum physics and thermal physics, and mathematics through differential equations. Students who present less than the above may be admitted with deficiency dependent on degree track subject to the approval of the department's Graduate Admissions Committee. Students may eliminate deficiencies while concurrently enrolling in graduate courses, provided prerequisites are met. While submission of Graduate Record Examination scores is not required for admission, students who have taken the GRE advanced physics test are urged to submit their test scores to the physics department to facilitate advising and placement.

Prerequisites to M.A. – Education Concentration Degree Program: The Department offers a Master of Arts Degree - Education Concentration. This program is designed for in-service secondary school teachers or students interested in teaching in community colleges. To be admitted to this program, students are expected to have earned credit in courses equivalent to PHYS 2054, PHYS 2074, PHYS 3113, and PHYS 3614. Deficiencies may be removed either by taking appropriate courses or by examination.

Philosophy of Graduate Education in Physics: All entering Physics and Applied Physics graduate students from June 1 through May 31 of the following year are formed into a Cohort. Cohort members form a natural work group during the first twenty-four months of graduate school, and the Cohort receives training in how to effectively apply their academic knowledge in professional group environments such as research – or teaching-based academic departments, large governmental research labs, or industrial settings. The Cohort training also fosters a supportive graduate community atmosphere that enhances the likelihood of academic success of all Physics Department graduate students.

The techniques used for this training have been developed at the University of Arkansas under the financial sponsorship of the NSF Integrative Graduate Education and Research Training (IGERT) program, and the U.S. Department of Education's Fund for the Improvement of Post Secondary Education (FIPSE) program. Through these methods, our graduate students exit our degree programs with the equivalent of one and a half years of on-the-job training in management techniques useful in a technology-based professional career setting.

Requirements for the Master of Arts Degree: Students choosing this degree program must form an advisory committee consisting of the research adviser as chair and two other members of the graduate faculty, at least one of whom must be from the Physics Department, by April 30 in their first year of study.

The M.A. degree requires 30 semester hours of graduate work. The candidate's program must include at least six semester hours of physics courses numbered 5000 or above, and at least three hours of 502V. Not more than nine semester hours of credit toward this degree will be allowed from physical science and graduate education courses. All courses selected to apply to this degree must be approved by the student's adviser in accordance with the above requirements. Recommended courses include PHYS 400V, PHYS 4113, PHYS 4213, PHYS 4621L, PHYS 588V, and PHYS 590V.

During year one of their graduate studies at the University of Arkansas, students will take PHYS 5811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5821 Ethics for Scientists and Engineers in their first summer. During year two, students will take PHYS 6811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5831 Proposal Writing and Management in their second summer. In addition, all students participate in two days of industrial style inventiveness and teaming training during the week directly preceding the start of fall classes. PHYS 5811, PHYS 6811, MEPH 5821, and MEPH 5831 cannot be counted as electives to meet the requirements for graduation.

Each person receiving the Master of Arts degree – Education concentration must have at least one hour of Master's Research, satisfied by a written research report based either on the 502V or a 588V project. A final comprehensive oral exam is given by the advisory committee.

Requirements for the Master of Science Degree: Students may choose between four Master of Science degrees in the physics department. These are the M.S. Physics (31-hour thesis path); M.S. Physics (37-hour non-thesis path); M.S. Applied Physics (31-hour thesis path); and M.S. Applied Physics (37-hour non-thesis path). All four M.S.

degree curricula prepare a student for the Physics Ph.D. degree.

Incoming graduate students will be advised by a departmental graduate advisor for the first two years. Students must form their thesis or advisory committees by the end of their third academic semester and file the appropriate forms with the Graduate School. The thesis committee (thesis-path students) consists of the research advisor as chair, two members of the physics faculty, and one member of the graduate faculty not from the Physics Department. The advisory committee (for non-thesis-path students) consists of the individual study project advisor as chair and two members of the physics faculty. Students in this degree program can choose either a 31-semester-hour thesis path or a 37-semester-hour non-thesis path.

All four M.S. degrees share the following academic requirements:

1. Completion of PHYS 5011 Seminar - Introduction to Research; PHYS 5073 Mathematical Methods for Electromagnetics; PHYS 5413 Quantum Mechanics I; PHYS 5333 Electrodynamics; and PHYS 5111 Research Techniques.
2. Completion of at least one of the following three courses: PHYS 5754 Applied Nonlinear Optics; PHYS 5713 Solid State Physics; or PHYS 5513 Atomic and Molecular Physics.

Students who have had similar courses at another institution may substitute up to 12 credit hours of other courses in lieu of those listed above, on a course-by-course basis, upon petitioning the Graduate Affairs Committee.

Elective courses will be used for the remaining required degree hours, and may include additional courses from item 2. The minimum number of physics elective hours, the maximum number of non-physics technical elective hours, and the minimum number of total elective hours are shown in the table.

	Physics Electives	Technical Electives	Total Electives
M.S. Physics thesis	11	0	11
M.S. Physics non-thesis	20	0	20
M.S. Applied Physics thesis	5	6	11
M.S. Applied Physics non-thesis	11	9	20

During year one of their graduate studies at the University of Arkansas, students will take PHYS 5811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5821 Ethics for Scientists and Engineers in their first summer. During year two, students will take PHYS 6811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5831 Proposal Writing and Management in their second summer. In addition, all students participate in two days of industrial style inventiveness and teaming training during the week directly preceding the start of fall classes. PHYS 5811, PHYS 6811, MEPH 5821, and MEPH 5831 cannot be counted as electives to meet the requirements for graduation.

Students will select electives from courses listed in the graduate catalog as appropriate to their field of specialization, with course selection approved by their thesis committee. For the purposes of this degree requirement, any Astronomy (ASTR) graduate course listed in the Graduate Catalog and taught through the physics department will be considered a Physics elective.

No more than one 4000-level course may be counted toward the 31-hour requirement for the thesis option, and no more than two 4000-level courses may be counted toward the 37-hour requirement for the non-thesis option.

Requirements for Thesis-Path M.S. Degrees: Completion of six master's thesis hours under PHYS 600V and a written thesis successfully defended in a comprehensive oral exam given by the student's thesis committee.

Requirements for Non-thesis Path M.S. Degrees: Completion of three hours under PHYS 502V Individual Study in Advanced Physics and a written project report successfully defended in a comprehensive oral exam given by the student's advisory committee. Students who pass the Physics Ph.D. candidacy examination will be considered to have satisfied the PHYS 502V requirement of the non-thesis path M.S. degrees.

Requirements for the Doctor of Philosophy Degree: To be admitted to candidacy for the Ph.D. degree the student must a) form a dissertation committee; b) pass the candidacy exam, c) obtain a minimum of B-grade in core physics courses and d) file a Declaration of Intent with the Graduate School.

Incoming graduate students will be advised by a departmental advisor for the first two years. Students must form their dissertation committees by the end of their third academic semester and file the appropriate forms with the Graduate School. The dissertation committee consists of the research advisor as chair, three members of the Physics faculty, and one member of the graduate faculty not from the Physics Department.

The candidacy examination covers three areas: Quantum mechanics, electromagnetism, and classical mechanics, all at the graduate level, although questions at the undergraduate level may also be asked. The exam is given on three days in the week preceding the start of the Spring semester classes. Students entering the graduate program in the Fall semester will take the exam no later than after three semesters of graduate study at the University of Arkansas, and those entering the graduate program in the Spring semester will take it no later than after the fourth semester of graduate study. A passing grade of 55 percent in each area will be required. The students will be allowed a second and final attempt in the failed areas the following year. In the exceptional cases where after the second attempt, the student has failed only one area and his/her score in that area is not below 50 percent, the faculty may allow a third attempt or an oral exam. This exam will be given within six weeks after the second attempt.

Ph.D. students must complete a minimum of 40 semester-hours in 5000- and/or 6000-level courses beyond their Bachelor of Science degrees. Courses taken to fulfill the requirements for one of the four University of Arkansas M.S. physics degrees can be included in this 40 semester-hour requirement. Students who have had similar courses as part of an M.S. physics program at another institution may obtain a waiver for up to 21 credit hours, on a course-by-course basis, upon petitioning to the Graduate Affairs Committee.

Ph.D. students must take PHYS 5011 Seminar – Introduction to Research, PHYS 5073 Mathematical Methods for Electromagnetics, PHYS 5413/5423 Quantum Mechanics I and II, PHYS 5333 Electrodynamics, PHYS 5713 Solid State Physics, PHYS 5513 Atomic and Molecular Physics, PHYS 5103 Advanced Mechanics, PHYS 5213 Statistical Mechanics, PHYS 5623L Experiment and Data Analysis, and PHYS 5111 Research Techniques.

A minimum grade of B is required in the following core courses: PHYS 5073 Mathematical Methods for Electromagnetics; PHYS 5413/5423 Quantum Mechanics I and II; PHYS 5333 Electrodynamics; PHYS 5103 Advanced Mechanics; and PHYS 5623L, Experiment and Data Analysis. If a minimum grade of B is not obtained, the course may be repeated once. If the student cannot obtain a minimum of B on two attempts, he/she will not be allowed to continue in the Ph.D. program.

Eleven additional hours in elective physics graduate courses will be required, and they must be selected from the 5000- or 6000-level courses listed in the graduate catalog appropriate to the student's field of specialization and approved by the student's advisory committee. For the purposes of this degree requirement, any Astronomy (ASTR) graduate course listed in the Graduate Catalog and taught through the physics department will be considered a physics elective. Additional elective courses outside of the physics department may be

taken with dissertation committee approval.

During year one of their graduate studies at the University of Arkansas, students will take PHYS 5811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5821 Ethics for Scientists and Engineers in their first summer. During year two, students will take PHYS 6811 Research and Operations Management Seminar in both fall and spring semesters and will take MEPH 5831 Proposal Writing and Management in their second summer. In addition, all students participate in two days of industrial style inventiveness and teaming training during the week directly preceding the start of fall classes. PHYS 5811, PHYS 6811, MEPH 5821, and MEPH 5831 cannot be counted as electives to meet the requirements for graduation.

Ph.D. students must also earn 18 hours of credit in Doctoral Dissertation, submit a dissertation, and defend it successfully in a comprehensive oral examination given by the dissertation committee.

Astronomy (ASTR)

ASTR5013 Astrophysics (Odd years, Fa) Introduction to astrophysics. The course covers stellar evolution, interstellar medium, galactic nucleogenesis and observational cosmology. Prerequisite: PHYS 3614, CHEM 3504, or graduate standing.

ASTR5033 Planetary Systems (Fa) The nature of the solar system and other planetary systems as deduced from observations and theoretical modeling. Structure and evolution of terrestrial and jovian planets and their satellites. Planetary atmospheres, magnetospheres, and the solar wind; planetary interiors. Theoretical and observed properties of exoplanetary systems; astrobiology.

Physics (PHYS)

PHYS400V Laboratory and Classroom Practices in Physics (Sp, Su, Fa) (1-3) The pedagogy of curricular materials. Laboratory and demonstration techniques illustrating fundamental concepts acquired through participation in the classroom as an apprentice teacher. Prerequisite: PHYS 3113 or PHYS 3414.

PHYS4073 Introduction to Quantum Mechanics (Fa) A survey of quantum mechanics from the wave mechanical point of view. Required course for B.S. Physics majors. Prerequisite: PHYS 3614 and MATH 3404. (Same as PHYS 4073I)

PHYS4103 Physics in Perspective (Odd years, Sp) Human implications of physics, including life's place in the universe, the methods of science, human sense perceptions, energy utilization, social impacts of technology, and the effect of physics on modern world views. No credit given toward a B.S. major in physics. Prerequisite: PHYS 3603 or PHYS 3614.

PHYS4113 Physics in Perspective (Odd years, Sp) Human implications of physics, including life's place in the universe, the methods of science, human sense perceptions, energy utilization, social impacts of technology, and the effect of physics on modern world views. Credit allowed for only one of PHYS 4113 or PHYS 4103. Prerequisite: PHYS 3614.

PHYS4203 Physics of Devices (Even years, Sp) Principles of physics applied in a selection of technologically important devices in areas including computing, communications, medical imaging, lasers, and energy utilization. Students will utilize technical journals. No credit given toward a B.S. major in physics. Prerequisite: PHYS 3603 or PHYS 3614.

PHYS4213 Physics of Devices (Even years, Sp) Principles of physics applied in a selection of technologically important devices in areas including computing, communications, medical imaging, lasers, and energy utilization. Students will utilize technical journals. Credit allowed for only one of PHYS 4203 or PHYS 4213. Prerequisite: PHYS 3614.

PHYS4333 Thermal Physics (Even years, Sp) Equilibrium thermodynamics, statistical physics, and kinetic energy. Prerequisite: PHYS 3614.

PHYS4621L Modern Physics Laboratory (Fa) (Formerly PHYS 462L) Advanced experiments, projects, and techniques in atomic, nuclear, and solid state physics. Prerequisite: PHYS 3614

PHYS4713 Solid State Physics (Sp) Crystal structure, diffraction and symmetry. Lattice vibrations, elasticity and optical properties. Electronic structure, band theory, transport and magnetism. Course emphasizes applications and current topics in semiconductors, optics and magnetism. Pre- or Corequisite: PHYS 3414 and PHYS 4073.

PHYS4803 Mathematical Physics (Irregular) Development of mathematics used in advanced physics, including tensors, matrices, group theory, special functions and operators. Prerequisite: MATH 3404.

PHYS500V Seminar (Sp, Su, Fa) (1-3) Regular informal discussions of research reported in journals and monographs. May be repeated for 3 hours.

PHYS5011 Introduction to Current Physics Research Seminar (FA) This seminar course introduces new Physics graduate students to the faculty of the Physics department and their current research efforts. Each Physics faculty member will introduce their research areas, laboratory facilities, current student population, etc. in preparation for students selecting the two laboratories they will visit in the spring semester under PHYS 5111.

PHYS502V Individual Study in Advanced Physics (Sp, Fa) (1-4) Guided study in current literature. May be repeated for 4 hours.

PHYS5033 Design and Fabrication of Scientific Apparatus (SU) Students will learn mechanical and electronic techniques used in the design and fabrication of scientific apparatus. (This course cannot be used to satisfy degree requirments in any physics program.)

PHYS5073 Mathematical Methods for Electromagnetics (FA) Mathematical methods used in physics with examples from electrostatics and magnetostatics. Prerequisite: MATH 3423 and PHYS 3414.

PHYS5083 Mathematical Methods of Physics II (Sp) Applications of matrices, tensors, and linear vector spaces to problems in physics. Introduction to groups and their representations, and symmetry principles in modern physics. Prerequisite: PHYS 5073 or MATH 5073. (Same as MATH 5083)

PHYS5093 Applications of Group Theory to Physics (SP) Application of group theory to topics in physics, especially to atomic/molecular and solid-state physics. Prerequisite: PHYS 5073

PHYS5103 Advanced Mechanics (Even years, Fa) Dynamics of particles and rigid bodies. Hamilton's equations and canonical variables. Canonical transformations. Small oscillations. Prerequisite: PHYS 5073.

PHYS5111 Research Techniques Through Laboratory Rotations Graduate students will be introduced to detailed operational aspects of two Physics research laboratories through extensive observation of those laboratory's operations during a six week rotation through each lab. Planning for starting a research project in the summer will take place in the final three week rotation period.

PHYS5213 Statistical Mechanics (Odd years, Fa) Classical and quantum mechanical statistical theories of matter and radiation. Prerequisite: PHYS 4333 and PHYS 4073 or PHYS 5413.

PHYS5263L Experiment and Data Analysis (FA) This course is devoted to learning some of the frequently used experimental techniques and methods by which experimental data are analyzed to extract quantitative information on physical parameters. Students will perform experiments, analyze data, and write lab reports. Prerequisite: Graduate Standing or Instructor Consent.

PHYS5333 Electrodynamics (SP) Wave solutions of Maxwell's equations in free space, wave guides, and resonators; radiation, diffraction and scattering of E&M waves; special relativity and the relativistic formulation of Maxwell's equations. Prerequisites: PHYS 3414 and PHYS 5073.

PHYS5363 Scientific Computation and Numerical Methods (FA) An introduction to numerical methods used in solving various problems in engineering and the sciences. May not earn credit for this course and MATH 4353 or MATH 4363. (Same as MATH 5363)

PHYS5413 Quantum Mechanics I (Fa) Non-relativistic quantum mechanics; the Schrodinger equation; the Heisenberg matrix representation; operator formalism; transformation theory; spinors and Pauli theory; the Dirac equation; applications to atoms and molecules; collision theory; and semiclassical theory of radiation. Prerequisite: PHYS 4073.

PHYS5423 Quantum Mechanics II (Sp) Continuation of PHYS 5413 Prerequisite: PHYS 5413.

PHYS5513 Atomic and Molecular Physics (Odd years, Sp) Survey of atomic and molecular physics with emphasis on the electronic structure and spectroscopy of 1 and 2 electron atoms and diatomic molecules. Includes fine and hyperfine structure, Zeeman and Stark mixing of states, collision phenomena, radiative lifetimes, and experimental techniques. Prerequisite: PHYS 4073 or PHYS 5413.

PHYS5523 Theory of Relativity (Irregular) Conceptual and mathematical structure of the special and general theories of relativity with selected applications. Critical analysis of Newtonian mechanics; relativistic mechanics and electrodynamics; tensor analysis; continuous media; and gravitational theory. Prerequisite: PHYS 5103.

PHYS5653 Subatomic Physics (Irregular) Nuclear structure and nuclear reactions. Nature and properties of elementary particles and resonances, their interactions and decays. Phenomenological theory and discussion of experimental evidence. Prerequisite: PHYS 3614.

PHYS5713 Solid State Physics (Even years, Sp) Crystalline structure, lattice dynamics. Debye theory, electron theory of metals, band theory of solids, superconductivity, and magnetism. Prerequisite: PHYS 4073 or PHYS 5413.

PHYS5734 Laser Physics (Sp) A combined lecture/laboratory course covering the theory of laser operation, laser resonators, propagation of laser beams, specific lasers such as gas, solid state, semiconductor and chemical lasers, and laser applications. Prerequisite: PHYS 3414 and PHYS 3544.

PHYS574V Internship in College or University Teaching (Sp, Su, Fa) (3-9) Supervised field experiences in student personnel services, college administration, college physics teaching, institutional research, development, or other areas of college and university work. Pre- or Corequisite: PHYS 400. May be repeated for 3 hours.

PHYS5754 Applied Nonlinear Optics (Odd years, Fa) A combined lecture/laboratory course. Topics include: practical optical processes, such as electro-optic effects, acousto-optic effects, narrow-band optical filters, second harmonic generation, parametric amplification and oscillation, and other types of nonlinear optical spectroscopy techniques which are finding current practical applications in industry. Prerequisite: PHYS 3414 and PHYS 3544.

PHYS5774 Introduction to Optical Properties of Materials (Sp) A combined lecture/laboratory course covering crystal symmetry optical transmission and absorption, light scattering (Raman and Brillouin) optical constants, carrier mobility, and polarization effects in semi-conductors, quantum wells, insulators, and other optically important materials. Prerequisite: PHYS 3414 and PHYS 3544 or Permission of Instructor.

PHYS5794 Lightwave Communication (Even years, Sp) A laboratory-based course in light propagation in planar and fiber waveguides, optical coupling, operation principles of semiconductor lasers, detectors, and LEDs, hands-on experience with applications in communication systems. Prerequisite: PHYS 3414 or ELEG 3703.

PHYS5811 Research and Operations Management Seminar (Sp, Su, Fa) Weekly seminar of physics candidates for the Master of Science degree to discuss issues that impact a technical group's research and operational effectiveness. Topics include ethics, applications of procedures, cultural impact on operations, and team-based methodologies as well as current events in the interaction between technology and human affairs. Prerequisite: physics graduate standing. May be repeated for 6 hours.

PHYS5823 Advanced Device Design (Fa) Study of the state-of-the-art physics of materials applied to advanced technology devices. Students will define new devices based on current physics research on campus, and will predict both technological and market suc-

cess of the devices using technology market space analysis techniques. Prerequisite: physics graduate standing.

PHYS5833 Advanced Device Prototypes (Sp) Continuation of PHYS 5823, with reduction to practice of devices defined in PHYS 5823. Student teams will develop deeper understanding of the physics of materials identified, predict the characteristics of devices made from those materials, and fabricate and characterize prototype devices. Prerequisite: PHYS 5823.

PHYS588V Selected Topics in Experimental Physics (Irregular) (1-3) May be repeated for 3 hours.

PHYS590V Master of Arts Research (Sp, Su, Fa) (1-6)

PHYS600V Master of Science Thesis (Sp, Su, Fa) (1-6)

PHYS6413 Quantum Mechanics III (Even years, Fa) Relativistic quantum mechanics, second quantization, with applications to quantizing electromagnetic fields and to many-body theory. Introduction to Feynman diagrams. Prerequisite: PHYS 5423.

PHYS6613 Quantum Optics (Odd years, Fa) Properties of light and its interaction with atoms, particular attention given to the laser and recent experiments. Classical theory of resonance; Optical Bloch Eqs.; 2 level atoms in steady fields; pulse propagation; semiclassical theory of the laser, coherent states and coherent functions; gas, solid, and dye lasers; photon echoes and superradiance; quantum electrodynamics and spontaneous emission. Prerequisite: PHYS 5413 or equivalent.

PHYS6713 Advanced Solid State Theory (Irregular) Quantum mechanical approach to the theory of solids, including such topics as group theory, crystalline field theory, electron-photon interactions, band theory of solids, transport phenomena, superconductivity, and magnetic properties of solids. Prerequisite: PHYS 5713 and PHYS 5413.

PHYS6811 Research and Operations Management Seminar (Sp, Su, Fa) Weekly seminar of physics candidates for the Doctor of Philosophy degree to discuss issues that impact a technical group's research and operational effectiveness. Topics include ethics, applications of procedures, cultural impact on operations, and team-based methodologies, as well as current events in the interaction between technology and human affairs. Prerequisite: physics graduate standing and PHYS 5811. May be repeated for 12 hours.

PHYS700V Doctoral Dissertation (Sp, Su, Fa) (1-18) May be repeated for 18 hours.

PLANT PATHOLOGY (PLPA)

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- University Professors Riggs, TeBeest
- Professors Cartwright (R.), Correll, Fenn, Gergerich, Kirkpatrick, Lee, Lim, Milus, Robbins, Rothrock, Rupe, Weidemann
- Associate Professors Coker, Korth, Spradley,Yang
- Assistant Professor Vann
- Adjunct Professors Damicone, Griffey
- Adjunct Associate Professor Jia
- Adjunct Assistant Professor Cartwright (D.)

Degree Conferred:

M.S. (PLPA)
Ph.D. (PTSC) See Plant Science

Areas of Concentration: Plant pathology.

Primary Areas of Faculty Research: Research areas of the faculty of the Department of Plant Pathology are diverse, including fundamental studies emphasizing fungal, viral, nematode, and bacterial pathogens of plants, as well as mission-oriented research aimed at solving specific disease problems. Research projects are wide-ranging, extending from basic and molecular aspects of disease and pathogenesis to more applied research on disease control methods for the major food and fiber crops in the world. Specific areas include: fungal ecology and genetics, nematology, virology, soil ecology, molecular biology of plant pathogens, biological control of plant diseases, genetics and physiology of parasitism and resistance, and diseases of cotton, fruits, rice, soybean, turfgrass, vegetables, wheat, corn, and sorghum.

Prerequisites to the M.S. Degree Program: Specific course prerequisites are not required for admission to the M.S. program. However, a strong undergraduate background in an agricultural, biological, and/or physical science is highly desirable. Deficiencies or prerequisites for advanced courses may be included in the individual student's academic program.

Requirements for the Master of Science Degree: A thesis reporting results of original research and a minimum of 24 semester hours of course work (including 15 semester hours in plant pathology) plus 6 semester hours of thesis credit are required. The student must pass a comprehensive oral examination and successfully defend the thesis upon its completion.

Plant Pathology offers students an opportunity to earn a Ph.D. through the interdepartmental program in Plant Science (see Plant Science – PTSC). In the Plant Science program, students may fulfill most required course work and original research required for a dissertation in the Department of Plant Pathology.

Plant Pathology (PLPA)

PLPA400V Research (Sp, Su, Fa) (1-6) Original investigations of assigned problems in plant pathology. Prerequisite: PLPA 3004.

PLPA4103 Plant Disease Control (Fa) Principles, methods and mechanics of plant disease control. Emphasis is given to the integration of control measures and epidemiology of plant diseases. Lecture 3 hours per week. Prerequisite: PLPA 3004.

PLPA4333 Biotechnology in Agriculture (Fa) Discussion of the techniques, applications, and issues of biotechnology as it is being used in modern agriculture. Coverage includes the basics of molecular biology, production of transgenic plants and animals, and new applications in the agricultural, food, and medical marketplace. Lecture and discussion, 3 hours per week.

PLPA5001 Seminar (Sp, Fa) Review of scientific literature and oral reports on current research in plant pathology. Prerequisite: graduate standing. May be repeated for 4 hours.

PLPA502V Special Problems Research (Sp, Su, Fa) (1-6) Original investigations of assigned problems in plant pathology. Prerequisite: graduate standing.

PLPA504V Special Topics (Irregular) (1-18) Lecture topics of current interest not covered in other courses in plant pathology or other related areas. Prerequisite: graduate standing. May be repeated for 18 hours.

PLPA5303 Advanced Plant Pathology: Host-Pathogen Interactions (Odd Years, Sp) Presentation of important contemporary concepts relative to disease resistance and the physiology, biochemistry, and molecular biology of plant-pathogen interactions. Lecture 3 hours per week. Prerequisite: PLPA 3004 or equivalent and graduate standing.

PLPA5313 Advanced Plant Pathology: Ecology and Epidemiology (Even years, Sp) Presentation of important contemporary concepts relative to the ecology and epidemiology of foliar and soil-borne plant pathogens. Lecture 3 hours per week. Prerequisite: PLPA 3004 and graduate standing.

PLPA5404 Diseases of Economic Crops (Su) Diagnosis and management of important diseases of cotton, fruits, rice, trees, soybeans, wheat, and vegetables will be covered in a lecture, laboratory, and field format. Lecture 2 hours, laboratory 4 hours per week. Four 1-day field trips will be involved. Corequisite: Lab component. Prerequisite: PLPA 3004.

PLPA5532 Professionalism in Plant Science (Odd years, Sp) Discussion of professionalism in science, science ethics and other topics associated with science as a profession such as research funding, writing for publication, career choices, and career development. Prerequisite: graduate standing.

PLPA5603 Plant Pathogenic Fungi (Odd years, Fa) Plant Pathogenic Fungi is structured as an integrated lecture/laboratory class designed for students that are interested in developing an understanding and appreciation for taxonomy, biology, and ecology of plant pathogenic fungi and realted saprophytic fungi. Corequisite: Lab component. Prerequisite: PLPA 3004 or BIOL 4424 or graduate standing.

PLPA5713 Introduction of Electron Microscopy (Sp) Use of the electron microscope in biological research, including the preparation of various plant and animal specimens and their observation with the electron microscope. Lecture 1 hour, laboratory 4 hours per week. Prerequisite: graduate standing.

PLPA600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.

PLPA6203 Plant Virology (Odd years, Fa) Lecture emphasizing discussion of recent advances in plant virology. Laboratory concerned with techniques and equipment used in plant virus studies, including transmission of viruses, characterization utilizing ultracentrifugation, spectrophotometry, electrophoresis, electron microscopy, and serology. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: graduate standing.

PLPA6303 Plant Nematology (Even years, Fa) Nematodes and their relationship to plant diseases, with consideration of identification, morphology, biology, distribution, association with disease complexes and control. Lecture 2 hours, laboratory 2 hours per week. Corequisite: PLPA 6300L. Prerequisite: graduate standing.

PLPA6503 Plant Bacteriology (Odd years, Sp) Current concepts and techniques in

plant bacteriology, including taxonomic, ecological and molecular aspects of plant pathogenic bacteria and their interactions with hosts. Lecture 2 hours, laboratory 2 hours per weeks. Corequisite: Lab component. Prerequisite: BIOL 2013 and BIOL 2011L. May be repeated for 3 hours.

PLANT SCIENCE (PTSC)

Interdepartmental Doctoral Program, Departments of Horticulture and Plant Pathology

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- University Professors Riggs, TeBeest
- Professors Cartwright (R.), Clark, Correll, Fenn, Gergerich, Hensley, Kirkpatrick, Lee, Lim, Milus, Morelock, Murphy, Robbins (R.), Rom, Rothrock, Rupe, Weidemann
- Adjunct Professors Damicone, Griffey
- Associate Professors Andersen, Evans, Garcia, Karcher, Korth, Lindstrom, Richardson, Robbins (J.), Srivastava
- Adjunct Associate Professor Jia
- Assistant Professor Vann
- Adjunct Assistant Professor Cartwright (D.)

Degree Conferred:

Ph.D. (PTSC)

Areas of Concentration: Horticulture, plant pathology.

Primary Areas of Faculty Research: Biological control of plant diseases, breeding for disease resistance, fungal biology, forest pathology, diseases of crop plants, mycotoxicology, mycoplasmas, nematology, physiology of parasitism and resistance, plant disease control, phytobacteriology, soil microbiology, virology, genetics and plant breeding of fruit or vegetable crops, physiology and culture of fruit, vegetable or ornamental plants, and physiology and management of turfgrasses.

Prerequisites to Degree Program: In addition to the requirements for admission to the Graduate School, the student must submit to the Chair of Studies three letters of recommendation, which evaluate the potential of the student to pursue advanced graduate studies, and scores from the Graduate Record Examinations. Approval by the Plant Science Steering Committee is also necessary for acceptance into the program of study leading to the Doctor of Philosophy degree.

Admissions Requirements for Entry: The requirements for admission to the plant science Ph.D. program include the following: completion of an M.S. degree in a relevant biological science with a cumulative grade-point average of 3.00 or better (of 4.00), submission of scores from the verbal, quantitative, and written Graduate Record Examinations (GRE), three letters of recommendation indicating character and academic capability of the applicant, and official transcripts from all institutions attended.

Requirements for Doctor of Philosophy Degree: Each candidate must present a doctoral dissertation based on original research. Course requirements are established by the student's major adviser and the graduate advisory committee. The student must pass a candidacy examination at least two semesters before the expected conferral date of the degree. A final examination on the doctoral dissertation and cognate areas must be passed at least two weeks before the time of expected degree conferral. Students are expected to maintain a cumulative grade-point average of 2.85 or better (3.00 to graduate) as consistent with the policy of the Graduate School.

Students in the Plant Pathology concentration in the Plant Science program must pass written and oral candidacy examinations at least two semesters before the expected conferral date of the degree. In general, students are required to complete three graduate credits in horticulture, six graduate credits in an area appropriate to their dissertation research, two credits in the Plant Science Colloquium, Plant Pathology 4103, 5303, 5313, and 5404. In addition, students are expected to complete three of the four following courses: Plant Pathology 5603, 6203, 6303 or 6503. All students in the plant pathology concentration are expected to attend seminars in both departments and are required to present at least four seminars (while enrolled for credit in PLPA 5001 Seminar) to include the following: a research proposal seminar, two topic seminars on subjects other than their research area and an exit seminar describing the results of their dissertation research. Plant pathology will permit enrollment in one semester in CSES 5103 to be used as a substitute for one of the two topic seminars. All Ph.D. candidates are expected to gain teaching experience by assisting in the teaching of a regularly scheduled plant pathology course for one semester. Students with prior teaching experience can appeal to the Graduate Admissions Committee for a waiver in the Department of Plant Pathology. Additional requirements or waivers from these requirements are available in the Graduate Handbook in Plant Pathology.

Students in the Horticulture Concentration must take at least three graduate course credits in each of the participating departments (horticulture and plant pathology), at least six elective graduate credits outside of the program in an area appropriate to their dissertation research, two semesters (2 credits) in PTSC 6101 Plant Science Colloquium, one in each department, and students are required to present at least four seminars (while enrolled for credit in HORT 5001 Seminar) to include the following: a research proposal seminar, two topic seminars on subjects other than their research area and an exit seminar describing the results of their dissertation research.

All students will be expected to complete 18 hours of dissertation research.

Plant Sciences (PTSC)

PTSC5343 Seed Physiology (Irregular) Physiological process and molecular regulation in the development, dormancy, germination, and early growth of seeds. A basic knowledge of plants physiology expected. (Same as HORT 5343)

PTSC6101 Colloquium in Plant Sciences (Sp) Advanced discussion of topics in plant science on a participatory basis. Topics in plant pathology, horticulture and forestry will be treated. Prerequisite: graduate standing. May be repeated for 2 hours.

PTSC6203 Laboratory Instrumentation in Plant Science (Odd years, Sp) Principles, capabilities, and operation of laboratory instrumentation utilized in plant science research. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component.

PTSC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.

POLITICAL SCIENCE, DEPARTMENT OF (PLSC)

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- Professors Kelley, Miller, Reid, Shields, Waligorski
- Associate Professors Conge, Ghadbian, Kerr, Parry, Ryan, Schreckhise, Zeng

• Assistant Professor Dowdle
• Adjunct Professors Purvis, Smith

Degrees Conferred:

M.A. (PLSC)
M.P.A. in Public Administration (PADM)
J.D./M.A. (Dual Degree)
J.D./M.P.A. (Dual Degree)

M.A. Areas of Concentration: American politics and political theory, comparative politics and international relations, and public administration.

Primary Areas of Faculty Research: American politics, comparative politics, international relations, political theory, public administration.

Political Science (PLSC)

The M.A. degree in Political Science is designed to give students further training in selected areas of concentration within the discipline and to prepare them for careers in academe or public service.

Admission Requirements for the Master of Arts Degree Program: Applicants for graduate study in political science must be admitted to the Graduate School and also meet the following requirements: 1) satisfactory GRE scores, 2) submission of a written essay, and 3) three letters of recommendation from persons competent to judge the applicant's potential for graduate studies. Students from all academic backgrounds are encouraged to apply. Students who have had few political science courses at the undergraduate level may be required to enroll in undergraduate courses to begin their graduate studies.

Requirements for the Master of Arts Degree: The M.A. degree is a 36-semester hour program. Completion of the program is contingent upon passing a comprehensive examination or writing and defending a thesis. Courses at the 4000 level may be taken with the advisor's consent. Under special circumstances students may arrange to take graduate-level directed readings or independent research courses. Such courses require an application that must be approved by the student's graduate adviser in concert with the professor from whom the course is to be taken. The student must apply for such a course before the semester in which the course is to be taken.

Courses are offered in three areas of study: American politics and political theory, comparative politics and international relations, and public administration. From these offerings, students must select a primary area of study. A secondary field of no less than six hours will complement the choices in the primary field. Selection of the areas of concentration should be commensurate with the professional or career goals of the student. A minimum of 21 hours must be fulfilled by seminars (5000-level classes) in the student's chosen areas. All M.A. students are required to take PLSC 5913 Research Methods. Ph.D.-bound students are advised to take at least one additional methods or quantitative analysis course. Students must take a minimum of 24 of their 36 course hours in the Department of Political Science. The remaining hours may be taken in other departments.

Thesis Option: Students must take 30 hours of course work and six hours of thesis credit. Under this option, the student's comprehensive examination will be a defense of the thesis. All M.A. candidates in this option are required to develop a prospectus for their thesis. They must then write and orally defend an acceptable thesis.

Non-thesis Option: Students must take 36 semester hours of course work. Under this option, students must take a comprehensive examination in their primary field of study.

Public Administration (PADM)

The Master of Public Administration program is administered by the Department of Political Science. The major objectives of the program are as follows:

1. to provide a broad flexible program to prepare students for careers in public service and nonprofit management;
2. to afford opportunities to practicing administrators for improving their careers and services through advanced education and training; and
3. to prepare scholars for further graduate study in the field of public administration.

Prerequisites for Admission to the M.P.A. Degree Program:

1. Admission to the Graduate School
2. Minimum total score of 1,000 on the verbal and quantitative portions of the Graduate Record Examinations (GRE). (GRE scores may be waived under certain circumstances at the discretion of the PLSC Admissions Committee. Examples of possible exceptions include the successful completion of a master's degree or the submission of GMAT or LSAT scores in lieu of GRE scores).
3. 3.20 minimum grade-point average in the last 60 hours of undergraduate course work.
4. Students deficient in (2) or (3) above may be admitted if they score a minimum number of points according to the following formula: a total of at least 1600 points from (200 x GPA) + GRE score on verbal and quantitative sections; GPA based upon the last 60 hours of undergraduate work.
5. A written essay, submitted in accordance with standards set by the PLSC Admissions Committee.
6. Three letters of recommendation from persons competent to judge the applicant's academic/work experience.
7. Academic prerequisites: the PLSC Admissions Committee may require appropriate course work related to an understanding of governmental processes and activities to cover deficiencies in past education.
8. All requirements listed above must be completed and reported before the beginning of the student's second semester or the student will not be admitted to courses that semester.

Requirements for the Master of Public Administration Degree: The M.P.A. requires a total of 42 semester hours of which 27 hours are to be 5000-level courses or above.

Required Courses (9 semester hours)
PLSC 5193 Seminar in Public Admin.
PADM 5803 Quantitative Methods Analysis
PADM 5813 Methods in Public Management Information
Select five from the following 10 courses:
PLSC 5103 Human Behavior in Complex Organizations
PLSC 5113 Seminar: Human Resource Management
PLSC 5123 Public Budgeting and Finance
PLSC 5133 Management of Service Sector Organization
PLSC 5143 Administrative Law
PLSC 5163 Public Policy Formation and Analysis
PLSC 5183 Comparative Public Administration
PLSC 5243 Seminar in State and Local Politics
PADM 584V Special Topics in Public Administration
PLSC 4283 Federalism and Intergovernmental Relations

Special Interest Concentrations: Twelve to 18 graduate semester hours, depending on exercise of the internship, may be chosen in PLSC/PADM and other disciplines with approval of the M.P.A. Program Director. The M.P.A Program Director, in consultation with the student, will develop a set of relevant graduate courses that will help the student in meeting career objectives. Concentrations may be developed for students interested in fields such as local and state government management, nonprofit management, community development, information

and technology management, health services administration, human resource management, environmental policy management, and cultural resource management. Other concentrations may be exercised with the consent, advice, and approval of the M.P.A. Program Director.

Internship: (1-6 semester hours). The internship is recommended but not required. It will be offered on a credit/non-credit basis only. The number of semester hour credits depends on the length and full/part-time nature of the internship.

All students will be required to take a written comprehensive examination covering their M.P.A. program. This exam will be graded by at least a three person faculty committee selected by the M.P.A. Program Director. In addition to the successful completion of all course requirements and a passing grade on the written comprehensive examination, each student must present a minimum cumulative grade-point average of 3.00.

J.D/M.A. Program

The Department of Political Science, the Graduate School, and the School of Law cooperate in offering a dual degree program that allows a student to pursue the M.A. and the J.D. degrees concurrently.

The program described below requires: a) the student only select courses from comparative politics or international relations seminars in political science or equivalent courses in other departments approved by the graduate adviser in political science (total of 18 hours: 3 hours methods and 15 hours from a combination of international relations and comparative politics seminars), 6 additional hours of approved classes; b) the student adhere to the requirements described by the University of Arkansas School of Law.

Students must be admitted to the M.A. program and the School of Law. If a student seeks to enter the dual degree program after enrolling in either the law school or the M.A. program, he or she must obtain admission to the other degree program and the dual program during the first year of study.

The School of Law accepts nine semester hours of M.A. courses to satisfy requirements for the J.D. degree (The student may select from the following: PLSC 5503 Comparative Political Analysis; PLSC 5803 Seminar in International Politics; PLSC 5833 Seminar in Contemporary Problems; PLSC 4583 Political Economy of the Middle East; and ECON 4633 International Trade). Twelve hours of approved law school courses may be counted toward the M.A degree. To qualify for J.D. credit, the M.A. courses must come from a set of core courses and must be approved by the law school and the graduate director in political science. Students must earn a grade of "B" or higher in any M.A courses offered for credit toward the J.D. Students enrolled in law classes that are counted towards their political science degree cannot make a grade lower than a "C," However, these courses will not be counted against the Graduate School GPA.

For purposes of the M.A. degree, twelve hours of elective courses may be taken in the law school, provided they are not required for the J.D. degree and are in an area of concentration approved by the director of the M.A. program.

Students admitted to the dual degree program may commence their studies in either the law school or the M.A. program but must complete first year course requirements before taking courses in the other degree program. If they do not maintain the academic or ethical standards of either degree program, students may be terminated from the dual degree program. Students in good standing in one degree program but not in the other may be allowed to continue in the other program in which they have good standing and must meet the degree requirements of that program. If for any reason a student admitted to the dual degree program does not complete the M.A. degree, he or she cannot count nine hours of M.A. courses toward the J.D. degree. Likewise, M.A. students may not be able to count certain law courses if they decide to discontinue their studies in the law school. The J.D. will be awarded upon completion of all degree requirements; the M.A. will be awarded upon completion of the comprehensive examination and the successful defense of a master's thesis, or alternatively, six hours of additional course work.

All students will be required to take a written comprehensive examination covering their M.A. program. This exam will be graded by at least a three-person faculty committee selected by the M.A. Program Director. In addition to the successful completion of all course requirements and a passing grade on the written comprehensive examination, each student must present a minimum cumulative grade-point average of 3.00.

Thesis Option: Students pursuing the thesis option should consult the graduate coordinator of the political science department. The thesis committee must be composed of faculty members from both the School of Law and the Department of Political Science. Thesis credit is 6 hours.

Internship Option: Students may pursue an internship. Internship credit is variable and depends on the number of hours worked. Students in this option must consult with their J.D. and M.A. advisors. An internship work plan and expected academic work products will be developed.

J.D/M.P.A. Program

The Department of Political Science, the Graduate School, and the School of Law cooperate in offering a dual degree program that allows a student to pursue the M.P.A. and the J.D. degrees concurrently. Students must be admitted to the M.P.A. program and the School of Law. If a student seeks to enter the dual degree program after enrolling in either the law school or the M.P.A. program, he/she must obtain admission to the other degree program during the first year of study.

The School of Law accepts nine semester hours of M.P.A. courses to satisfy requirements for the J.D. degree. Fifteen hours of law school courses may be counted toward the M.P.A degree. To qualify for J.D. credit, the M.P.A. courses must come from a set of core courses and must be approved by the law school. Students must earn a grade of "B" or higher in any M.P.A courses offered for credit toward the J.D. For purposes of the M.P.A. degree, fifteen hours of elective courses may be taken in the law school, provided they are not required for the J.D. degree and are in an area of concentration approved by the director of the M.P.A. program.

Students admitted to the dual degree program may commence their studies in either the law school or the M.P.A. program but must complete first year course requirements before taking courses in the other degree program. If they do not maintain the academic or ethical standards of either degree program, students can be terminated from the dual degree program. Students in good standing in one degree program but not in the other may be allowed to continue in the other program in which they have good standing and must meet the degree requirements of that program. If for any reason a student admitted to the dual degree program does not complete the M.P.A. degree, he/she cannot count nine hours of M.P.A. courses toward the J.D. degree. Likewise, M.P.A. students may not be able to count certain law courses if they decide to discontinue their studies in the law school. The J.D. will be awarded upon completion of all degree requirements; the M.P.A. will be awarded upon completion of the comprehensive examination and the internship (and internship report), or alternatively, six hours of additional course work.

All students will be required to take a written comprehensive examination covering their M.P.A. program. This exam will be graded by at least a three-person faculty committee selected by the M.P.A. Program Director. In addition to the successful completion of

all course requirements and a passing grade on the written comprehensive examination, each student must present a minimum cumulative grade-point average of 3.00. Students enrolled in law classes that are counted towards their M.P.A. degree cannot make a grade lower than a "C." However, these courses will not be counted against the Graduate School GPA.

Political Science (PLSC)

PLSC400V Special Topics (Irregular) (1-3) Topics in political science not usually covered in other courses. May be repeated for 99 hours.

PLSC4053 Political Sociology (Fa) Analysis of political institutions and movements in relation to power, social class, ideology, and related variables. (Same as SOCI 4053)

PLSC4193 Administrative Law (Sp) Legal aspects of the administrative process and the effect of legal principles and processes upon administrative decision-making. Emphasis is given to the limitation of administrative discretion and the judicial review of administrative decision. Prerequisite: PLSC 3103 or PLSC 4253.

PLSC4203 American Political Parties (Sp, Fa) The nature, function, and history of political parties in the United States with emphasis on party membership, organization, campaign techniques, finance and electoral alliances. Prerequisite: PLSC 2003.

PLSC4213 Campaigns and Elections (Irregular) This course examines the American electoral process. It is an empirical course that provides opportunities for original analysis of survey data and election returns. Emphasis is placed on the most recent federal election.

PLSC4223 The American Congress (Fa) Thorough examination of the constitutional role of the legislative branch under the Constitution; the internal procedures and personalities of the Senate and House; the central place of Congress in shaping domestic and foreign policy. Prerequisite: PLSC 2003.

PLSC4243 Minority Politics (Sp) Reviews political action and concepts of political activity by minority groups, focusing on contemporary political behavior.

PLSC4253 The Supreme Court and the Constitution (Fa) United States Supreme Court decisions involving the functions and powers of Congress, the Supreme Court, and the President and federalism. Prerequisite: PLSC 2003.

PLSC4263 The Supreme Court and Civil Rights (Sp) United States Supreme Court decisions interpreting the political, economic, and civil rights of individuals and groups. Prerequisite: PLSC 2003.

PLSC4273 Political Psychology (Sp) Examines the role of the individual in the polity including basic psychological constructs of relevance to political action, the formulation and maintenance of stable political orientations, the patterns linking the individual to the polity, and major modes of inquiry. Prerequisite: PLSC 2003.

PLSC4283 Federalism and Intergovernmental Relations (Sp, Su, Fa) Analysis of changes in intergovernmental relations in the American federal system. Discussions will focus on political, economic/fiscal and administrative aspects of policy changes of the pre-and post-Reagan eras.

PLSC4373 Political Communication (Sp) Study of the nature and function of the communication process as it operates in the political environment. (Same as COMM 4373)

PLSC4503 African Politics (Sp) Comparative analysis of structures, processes and problems of selected Sub-Saharan African political systems.

PLSC4513 Creating Democracies (Even years, Fa) Analyses of the creation of democracies in Europe, South America, Asia, Africa, the Middle East, East Europe, and the former Soviet Union. Prerequisite: PLSC 2013.

PLSC4523 Global Politics of Food (Sp) This course explores the politics of food production, processing, transportation, and concumption on a global leve. (Same as ANTH 4183) (Same as ANTH 4183)

PLSC4543 Government and Politics of Eastern Europe (Sp) Study of the politics of East European nations primarily after World War II, with emphasis on the role of the period of communist rule and democratization. Prerequisite: PLSC 2003 or PLSC 2013.

PLSC4563 Government and Politics of Russia (Sp) Study of Russian and Soviet politics after 1917 and of the democratization of Russia and the other successor states. Prerequisite: PLSC 2003 or PLSC 2013.

PLSC4573 Gender and Politics (Even years, Sp) Examines the significance of gender in politics. Includes discussion of the women's movement and feminist theory, but emphasizes the content and process of public policy as it relates to women and men. Focus is on the U.S. but final third is devoted to comparative topics. Prerequisite: PLSC 2003 or PLSC 2013.

PLSC4583 Political Economy of the Middle East (Sp, Su, Fa) Examines the links between politics and economics in the Middle East and the impact of that nexus on development. Analyses of global and regional integration, oil states, statist development, liberalization and privatization, and resources and population movements to understand power and class in the area.

PLSC4593 Islam and Politics (Sp, Su, Fa) Compares contemporary Islamist political movements. Seeks to explain causes, debates, agendas, and strategies of Islamists in the political realm. Addresses sovereignty, the rule of law, visions of the good state and society, and relations between nationalism, religion and political development. Focus on Middle East with comparative reference to other cases.

PLSC4803 Foreign Policy Analysis (Sp) Comparative analysis of foreign policy, with attention paid to explanations at a variety of levels, such as the individual, group, organizational, societal, systemic.

PLSC4813 Politics of the Cold War (Fa) Examines the cold war from different perspectives; nature of the international system during the cold war; American and Soviet perceptions of the cold war; domestic political considerations; impact of the cold war on the economy, culture, and society; end of the cold war; the post-cold war world.

PLSC4823 Foreign Policy of East Asia (Sp) This course provides an introduction to the international relations of two major East Asian states, China and Japan. Key topics include: China and Japan's interaction with the world political and economic systems; domestic sources of international behavior and major dimensions of foreign policy in the 1980s and 1990s.

PLSC4833 international Political Economy (Sp) This course provides an analysis of the interaction between politics and markets in the world economy. Its central objective is to illustrate how political and state actions have shaped and been shaped by the development of the global economy.

PLSC4843 The Middle East in World Affairs (Sp) An analysis of geo-political and socio-economic characteristics of Middle Eastern societies and their impact on world economic and political order. Special attention to such issues as the Arab-Israeli conflict, the promotion of lasting peace in the region, impact of oil on world politics, the involvement of superpowers, rehabilitation of Palestinian refugees and the role of the United Nations.

PLSC4873 Inter-American Politics (Sp) An analysis of the political themes, regional organization, and hemispheric relations that constitute the inter-American system, with special emphasis on conflict and cooperation in the hemispheric policies of the American republics. Prerequisite: junior standing.

PLSC4903 Democratic Theory (Sp, Su, Fa) Analysis and comparison of classical and contemporary theories of democracy.

PLSC4923 Karl Marx: LIfe, Work, and Legacy (Sp) This course examines the writings of Karl Marx. Students will read and discuss his major works, including Capital, The German Ideology, and Grundisse. In order to understand Marx's writing, students will also explore his life, times, and legacy.

PLSC5103 Human Behavior in Complex Organizations (Fa) Review of the fundamental literature and a systematic analysis of various theories and research focusing on organization and behavior in public administration, including the discussion of organizational development, human motivation, leadership, rationality, efficiency and conflict management in public organizations. Prerequisite: graduate standing.

PLSC5113 Seminar in Human Resource Management (Sp) Intensive study of public personnel policies and practices, including legal foundations, classification and compensation plans, recruitment and selection processes, training, employment policies and morale, employee relations and organization. Prerequisite: graduate standing.

PLSC5123 Public Budgeting and Finance (Fa) Focuses on the budgeting process and governmental fiscal policy formulation, adoption, and execution. Prerequisite: graduate standing.

PLSC5133 Management of Service Sector Organizations (Sp) This course provides an overview of the principal management functions in public and nonprofit organizations. Topics include financial management, HR development, program development. The relationships among volunteer boards of trustees, fund raising, public relations, and program personnel are analyzed, and the complex environments with service sector agencies are explored. May be repeated for 3 hours.

PLSC5143 Administrative Law (Irregular) A seminar which examines the constitutional and statutory basis and authority of public organizations. Special attention focuses on the nature of the rule-making and adjudicatory powers of public agencies and on executive, legislative, and judicial restraints on such activities. Also considered is the role, scope, and place of public regulatory activities. Prerequisite: graduate standing.

PLSC5153 Environmental Politics and Policy (Even years, Fa) Surveys recent patterns of environmentalism in the U.S. and explores the nature of policy making with regard to environmental and economic development issues. Several debates are presented, such as conservation vs. preservation, multiple use vs. sustainability, intergovernmental policy implementation, incentives, and free market environmentalism.

PLSC5163 Public Policy (Sp) Research seminar examining the study of public policy making in complex human systems. Attention given to issues dealing with cognitive limitations in decisional settings, the use of reasoned persuasion vs. power, the appropriate application of technical analysis. Prerequisite: graduate standing.

PLSC5183 Comparative Public Administration (Irregular) A comparative study of administrative structures and processes in selected modern and modernizing political systems. Analysis includes the consideration of cultural, legal and political factors influencing the operation of bureaucratic institutions, developmental goals, and the methods of establishing and administering programs of social, economic and political development. Prerequisite: graduate standing.

PLSC5193 Seminar in Public Administration (Fa) Introduction to and synthesis of public administration theory, functions, history, public accountability and management concerns, economic impact of administrative decisions, current problems, and issues in the public sector. Prerequisite: graduate standing.

PLSC5203 Seminar in American Political Institutions (Fa) Research seminar dealing with selected aspects of the major governmental institutions in the United States. Prerequisite: graduate standing.

PLSC5213 Seminar in American Political Behavior (Sp) Reading seminar surveying major works on representative processes in American national politics, including political opinion, political leadership, political participation, voting behavior, political parties, and interest groups. Prerequisite: graduate standing.

PLSC5223 Seminar in Legislative Processes and Behavior (Fa) Research seminar dealing with legislative processes and behavior in the United States. Prerequisite: graduate standing.

PLSC5233 Disability Policy in the United States (Sp, Su, Fa) An analysis of public policy approaches to disability in the United States. Examines the political and philosophical origins of disability policy; reviews major disability legislation and its effects on policy stakeholders; describes recent policy initiatives; analyzes evolution of disability policy with context of changing societal, economic and political conditions. Prerequisite: graduate standing. (Same as RHAB 6203)

PLSC5243 Seminar in State and Local Politics (Sp, Su, Fa) Research seminar dealing with selected aspects of state and local institutions and politics such as comparative policy-making, political culture variations, and community power structures. Prerequisite: graduate standing.

PLSC5383 Seminar in Political Communication (Irregular) Research seminar

focusing on selected topics such as candidate imagery, diffusion of political information, or political symbolism. Prerequisite: graduate standing.
PLSC5503 Comparative Political Analysis (Fa) A selection of topics to provide the theoretical, conceptual and methodological and foundation for the analysis of contemporary political systems. Prerequisite: graduate standing.
PLSC5513 Seminar in Politics of the Middle East (Sp, Su, Fa) Explores the major lines of inquiry on the politics of the state and society in the context of endogenous and exogenous forces that have influenced conceptions of power, legitimacy, and identity. Prerequisite: graduate standing.
PLSC5523 Topics in Politics of the Middle East (Sp, Su, Fa) Indepth analysis of specific political phenomena in the contemporary Middle East. Inquiry will vary but may focus on gender, political economy, politics of inclusion and exclusion (democratization and authoritarianism), or the politics of oil. Prerequisite: graduate standing.
PLSC5563 Russian and Soviet Political Systems (Sp) Study of the political systems of the Soviet Union and the successor states. Prerequisite: graduate standing.
PLSC5573 Political Change in Latin America (Even years, Sp) Research seminar analyzing obstacles to change in Latin America while utilizing both North American and Latin American research frameworks and techniques that deal with the theory and measurement of stability and development. Prerequisite: graduate standing.
PLSC560V Teaching Foreign Cultures in Social Studies Curriculum (Su) (1-18) Extensive examination of foreign cultures (West Europe, USSR, China, Latin America) and methods of teaching about them in secondary school social studies. Four week residential summer institute. (Same as HIST 560V)
PLSC5803 Seminar in International Politics (Fa) Research seminar providing intensive coverage of selected topics in theories of international relations, the comparative study of foreign policy making, and international organizations. Prerequisite: graduate standing.
PLSC5833 Seminar in Contemporary Problems (Fa) Seminar with concentrated reading in selected and specialized areas of contemporary international relations. Prerequisite: graduate standing. May be repeated for 6 hours.
PLSC5843 International Legal Order (Sp) Analysis of distinctive characteristics of contemporary international law. Topics include role of legal order in controlling the use of force in international relations and the impact of social and political environment on growth of international law and relations among international political systems. Prerequisite: graduate standing.
PLSC590V Directed Readings in Political Science (Sp, Su, Fa) (1-3) Prerequisite: graduate standing. May be repeated for 6 hours.
PLSC5913 Research Methods in Political Science (Fa) Methods relevant to research in the various fields of political science. Required of all graduate students in political science. Prerequisite: graduate standing.
PLSC592V Internship in Political Science (Sp, Su, Fa) (1-6) Internship in a local, state, regional, or federal agency. Paper required on a significant aspect of internship experience. Prerequisite: graduate standing.
PLSC593V Special Topics (Sp, Su, Fa) (1-3) Topics in political science not usually covered in other courses. Prerequisite: Graduate Standing. May be repeated for 3 hours.
PLSC595V Research Problems in Political Science (Sp, Su, Fa) (1-3) Prerequisite: graduate standing. May be repeated for 6 hours.
PLSC5963 Modern Political Thought (Fa) European political thinking since the rise of the nation-state and the relevance of that tradition to contemporary politics. Prerequisite: graduate standing.
PLSC5973 Contemporary Normative Political Theory (Sp) Analysis of current normative problems of political theory such as obligation, dissent, justification, sovereignty and tolerance, and major schools of thought including Marxism, liberalism and western conservatism. Prerequisite: graduate standing.
PLSC600V Master's Thesis (Sp, Su, Fa) (1-6)
PLSC690V Directed Research (Sp, Su, Fa) (1-6) Doctoral level directed readings and research. May be repeated for 6 hours.

Public Administration (PADM)

PADM5803 Quantitative Methods Analysis (Fa) Data analysis techniques, including descriptive and inferential statistics and packaged computer programs. Prerequisite: (Appropriate undergraduate statistics course or equivalent) and graduate standing.
PADM5813 Methods in Public Management Information (Sp) Quantitative approaches toward an understanding of public administration and statistical tools for analysis of administrative problems and programs. Prerequisite: PADM 5803 or equivalent and graduate standing.
PADM5823 Grantwriting for the Social Sciences (Irregular) This course will teach students the fundamentals of obtaining grants from local, state and federal agencies.
PADM584V Special Topics in Public Administration (Irregular) (1-3) Topic varies. May be repeated for 6 hours.
PADM587V Professional Development (Sp, Su, Fa) (1-6) Encompasses internships, professional projects if individual is employed full-time and not eligible for an internship, conference and workshop participation, and other activities conducive to the students development as a public service professional.
PADM588V Directed Readings (Sp, Su, Fa) (1-3) Prerequisite: graduate standing.
PADM589V Independent Research (Sp, Su, Fa) (1-3) Prerequisite: graduate standing.

POULTRY SCIENCE (POSC)

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- University Professors Chapman, Waldroup (P.W.)
- Professors Anthony, Bottje, Coon, Erf, Goodwin, Hargis, Jones, Kuenzel, Li, Marcy, Slavik, Wideman
- Research Professors Donoghue (A), Huff (B), Huff (G.), Rath
- Associate Professors Bramwell, Clark, Donoghue (D.), Emmert, Owens, Watkins
- Assistant Professor Kwon
- Research Assistant Professors Haggard, Pumford
- Adjunct Professors Brister, Johnson, Keck, Plue, Porter, Rhoads, Rosen, Steelman, Taylor, Waldroup (A.), Yazwinski, Zelenka
- Adjunct Associate Professors Berghman, Story
- Adjunct Assistant Professors Barton, Breeding, Davis, Meullenet, Schneider, Smith-Blair

Degrees Conferred:

M.S., Ph.D. (POSC)

Areas of Concentration: Graduate studies may be pursued in subject matter areas of food safety, genetics, immunology, microbiology, nutrition, parasitology, pathology, product technology, poultry health, management, and physiology. Poultry and laboratory animals are available for research programs in the poultry science department.

Prerequisites to Degree Program: The student pursuing a program for a Master of Science degree must meet all general requirements of the Graduate School. In addition, the student must have completed the B.S. degree in a college or university with a major or equivalent in one of the areas of the poultry science department. All applicants must submit at least three letters of recommendation and scores on the Graduate Record Examinations.

For acceptance into the Ph.D. degree program, a grade-point average of 3.00 on all previous graduate work and scores on the Graduate Record Examinations must be presented.

Requirements for the Master of Science Degree: minimum 30 hours. The student and adviser will prepare a program of work that may include additional undergraduate basic courses and at least 24 semester hours of studies plus the completion of a thesis and one research paper. Any deficiencies in undergraduate major requirements or prerequisites for advanced courses may be included in the student's program; however, they may not be included as part of the 24 hours needed to fulfill the M.S. degree.

Requirements for the Doctor of Philosophy Degree: In addition to the general requirements of the Graduate School are those of the department, which consist of a program of research, appropriate course work and seminars as specified by the student's graduate committee. In addition, a dissertation and two research papers acceptable to the committee are required.

Poultry Science (POSC)

POSC4213 Integrated Poultry Management Systems (Sp) Major managerial systems in the integrated commercial poultry industry. Development of an understanding of the basic decision making processes of poultry companies and the factors influencing those decisions. Prerequisite: POSC 2353 and AGEC 1103 and AGEC 2303.

POSC4223 Risk Analysis for Biological Systems (Odd years, Fa) Principles of risk assessment including exposure assessment and dose response, and risk management. Methods of risk analysis modeling and simulation with computer software. Applications of risk analysis in animal, food and environmental systems. Prerequisite: STAT 2023 (or STAT 2303 or AGEC 2403 or AGST 4023) and BENG 1022. (Same as FDSC 4223)
POSC4314 Egg and Meat Technology (Fa) Study of the science and practice of processing poultry meat and egg products; examination of the physical, chemical, functional and microbiological characteristics of value added poultry products; factors affecting consumer acceptance and marketing of poultry products and the efficiency of production. Corequisite: Lab component. Prerequisite: (CHEM 1123 and CHEM 1121L) or (CHEM 1074 and CHEM 1071L) and BIOL 1543 and BIOL 1541L.
POSC4333 Poultry Breeding (Odd years, Fa) Application of new developments in poultry breeding for efficient egg and meat production. Not intended for students interested in a career in veterinary sciences. Lecture 3 hours per week. Prerequisite: MATH 1203 or higher and junior standing.
POSC4343 Poultry Nutrition (Sp) Principles of nutrition as applied to the formulation of practical chicken and turkey rations. Lecture 3 hours per week. Prerequisite: CHEM 2613 or CHEM 3603 and junior standing.
POSC4434 Fundamentals of Reproductive Physiology (Fa) Principles of avian reproductive physiology with emphasis on poultry. Lecture 3 hours, laboratory 3 hours per week. Corequisite: lab component. Prerequisite: POSC 1023 and POSC 3123.
POSC4743 Analytical Methods in Animal Nutrition (Sp) Experience in the techniques used in the modern animal nutrition laboratory and the interpretation of experimental data. Lecture 1 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: CHEM 1123 and CHEM 1121L.
POSC500V Special Problems (Sp, Su, Fa) (1-6) Work in special problems of poultry industry. Prerequisite: graduate standing.
POSC510V Special Topics in Poultry Sciences (Irregular) (1-4) Topics not covered in other courses or a more intensive study of specific topics in poultry science. Prerequisite: graduate standing. May be repeated for 99 hours.
POSC5123 Advanced Animal Genetics (Even years, Fa) Specialized study of animal genetics. Lecture 3 hours per week. Prerequisite: POSC 3123 or ANSC 3123. (Same as ANSC 5123)
POSC5143 Biochemical Nutrition (Even years, Fa) Interrelationship of nutrition and physiological chemistry; structure and metabolism of physiological significant carbohydrates, lipids, and proteins; integration of metabolism with provision of tissue fuels; specie differences in regulatory control of tissue and whole body metabolism of nutrients. Prerequisite: CHEM 3813. (Same as ANSC 5143)
POSC5152 Protein and Amino Acid Nutrition (Even years, Sp) Students will be introduced to the basic processes of protein digestion, amino acid absorption, transport, metabolism, and utilization along with how biochemical function of proteins and their dynamic state affect nutritional status for animals and man. Prerequisite: CHEM 3813. (Same as ANSC 5152)
POSC5313 Domestic Animal Bacteriology (Fa) A study of bacteria pathogenic for domestic animals. Lecture 3 hours per week.
POSC5343 Advanced Immunology (Sp) Aspects of innate, cell-mediated, and humoral immunity in mammalian and avian species. Molecular mechanisms underlying the function of the immune system are emphasized. A course in Basic Immunology prior to enrollment in Advanced Immunology is recommended but not required. Lecture 3 hours per week. (Same as BIOL 5343)
POSC5352L Immunology in the Laboratory (Sp) Laboratory course on immune-diagnostic laboratory techniques and uses of antibodies as a research tool. Included are cell isolation and characterization procedures, immunochemistry, flow cytometry, ELISA and cell culture assay systems. Laboratory 6 hours per week. Prerequisite: POSC 5343 or BIOL 5343 or BIOL 4713.
POSC5742 Advanced Poultry Diseases (Sp) The most important diseases of poultry will be covered in depth and the course will focus on understanding mechanisms of pathogenesis, diagnostic techniques and principles of prevention. Lecture/discussion 2 hours per week with Kodachrome slides and microscopic slides utilized. Prerequisite: POSC 3223.
POSC5743L Advanced Analytical Methods in Animal Sciences Laboratory (Fa) Introduction into theory and application of current advanced analytical techniques used in animal research. Two 3-hour laboratory periods per week.
POSC5752L Advanced Poultry Diseases Laboratory (Sp) This course covers laboratory techniques utilized for the isolation, identificationand diagnosis of poultry diseases with a microbial cause. Students will learn diagnostic virology, bacteriology, serology and mycology. Labortories 3 hours twice weekly and then as needed to complete assignments. Prerequisites: POSC 3223 and POSC 5742.
POSC5763 Protozoan Parasites of Domestic Livestock and Companion Animals (Even years, Fa) Course topics will include economically and medically important protozoan parasites of domestic livestock and companion animals, with an emphasis on their significance for animal and human health. Lecture/discussion 3 hours per week. (Same as ANSC 5763). Prerequisite: general undergraduate biology and chemistry. (Same as ANSC 5763)
POSC5853 Advanced Meats Technology (Even years, Su) An intensive study of processed meats, relating the science, technology, and quality of further processed meat and poultry products. Product development, sensory and chemical analysis, microbiology, nutritional aspects, and product labeling are covered. Lecture 2 hours, laboratory 2 hours per week. Prerequisite: ANSC 3613 or POSC 4314. (Same as ANSC 5853)
POSC5873 Molecular Analysis of Foodborne Pathogens (Fa) Course topics will include molecular detection and identification of foodborne pathogens, the molecular response of foodborne pathogens to their environments, functional genomic approaches, and analysis of complex microbial communities. Lecture/discussion 3 hours per week.
POSC5901 Graduate Seminar (Sp, Fa) Critical review of the current scientific literature pertaining to the field of poultry science. Oral reports. Recitation 1 hour per week. Prerequisite: senior standing.
POSC5922 Neuroscience (Fa) Course covers cellular through neural systems, major brain functions and comparative neuroanatomy between mammals and birds. Specific topics include coverage of ion channels, membrane potentials, action potentials, synaptic integration, neurotransmitters, major brain regions of mammals and birds, sensory systems and the autonomic nervous system. Lecture 3 hours; Neuroscience Journal Club 1 hour per week (for first 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042. (Same as ANSC 5922)
POSC5932 Cardiovascular Physiology of Domestic Animals (Fa) Cardiovascular physiology, including mechanisms of heart function and excitation, and blood vessel mechanisms associated with the circulatory system in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042. (Same as ANSC 5932)
POSC5933 Environmental Physiology of Domestic Animals (Odd years, Fa) Study of the environment of domestic animals and its effect on physiological systems that affect maintenance, growth, production, and reproduction. Lecture 3 hours per week. Prerequisite: (ANSC 3032 or POSC 3032) and CHEM 3813.
POSC5942 Endocrine Physiology of Domestic Animals (Fa) Endocrine physiology, including mechanisms of hormone secretion, function, and regulation. Mechanisms associated with the endocrine system will be discussed for domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042. (Same as ANSC 5942)
POSC5952 Respiratory Physiology of Domestic Animals (Sp) Respiratory physiology, including mechanisms of lung function and gas exchange. Mechanisms associated with the interaction of the respiratory system with other bodily systems in domestic animals and poultry will be discussed. Lecture 3 hours; drill 1 hour per week for first 8 weeks of semester. Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042. (Same as ANSC 5952)
POSC5962 Gastrointestinal/Digestive Physiology of Domestic Animals (Sp) Gastrointestinal and hepatic physiology, including mechanisms of digestion, absorption of nutrients with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042 (Same as ANSC 5962)
POSC5972 Renal Physiology of Domestic Animals (Sp) Renal physiology, including mechanisms of renal clearance with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: ANSC/POSC 3032 and ANSC/POSC 3042. (Same as ANSC 5972)
POSC600V Thesis (Sp, Su, Fa) (1-6) Prerequisite: graduate standing.
POSC6343 Vitamin Nutrition in Domestic Animals (Even years, Sp) The vitamins required by domestic animals with emphasis upon their role in animal nutrition, physiological functions, and consequences of failure to meet the requirement of the animal. Lecture 3 hours per week. Prerequisite: (ANSC 3143 or POSC 4343) and CHEM 3813. (Same as ANSC 6343)
POSC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: graduate standing.

PSYCHOLOGY (PSYC)

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- Professors Cavell, Knowles, Lohr, Schroeder, Stripling
- Associate Professors Behrend, Beike, Freund, Petretic, Westendorf
- Assistant Professors Bering, Fuendeling, Lampinen, Levine, Murray, Williams
- Adjunct Assistant Professors Jenkins, Matthews, Perry

Degrees Conferred:

M.A., Ph.D. (PSYC)

Areas of Concentration: The degree of Doctor of Philosophy is offered in the fields of experimental psychology and clinical psychology. The program is designed to produce experimental and clinical psychologists with broad knowledge of the field. Specialization for research is required during the student's last two years of study.

Primary Areas of Faculty Research: The Ph.D. program in Clinical Psychology follows the scientist/practitioner model of training. While the majority of our graduates obtain applied, direct service provision positions, our training curriculum is such that those students whose career aspirations have been directed toward aca-

demic and research positions also have been successful. The Clinical Training Program is based on the premise that clinical psychologists should be skilled practitioners and mental health service providers as well as competent researchers. To facilitate these goals, we strive to maximize the match between the clinical and research interests of the faculty with those of the graduate students. The academic courses and clinical experiences are designed to promote the development in both areas. The objective of the Clinical Training Program is to graduate clinical psychologists capable of applying psychological theory, research methodology, and clinical skills to complex clinical problems and diverse populations. The program is fully accredited by the American Psychological Association.

The primary concentration of the Experimental Training Program is our Social and Cognitive Processes focus area, with emphases in the traditional subareas of social, cognitive, and developmental psychology. The faculty and students in the focus area typically have their primary research programs within one of these major subareas, although ad hoc research teams may also investigate questions at the intersections of these areas. In addition to Social and Cognitive Processes, other individual faculty members provide training to students interested in Brain and Physiological Psychology and in Cognitive Aging. Students in the Experimental Training Program are trained to have excellent statistical and writing skills, to become competent and autonomous researchers, and to contribute to the field of psychology through presentations at professional conferences and publications in scholarly journals. Opportunities for extensive supervised teaching experience are also available to our students. Graduates of the Experimental Training Program typically obtain teaching and academic positions after graduation, while others take jobs in the private sector.

Prerequisites to Degree Program: The candidate for admission to graduate study in psychology must satisfy the requirements of the Graduate School and have the approval of the Admission Committee of the appropriate training program. Scores on the Aptitude Section and the Advanced Psychology Section of the Graduate Record Examinations must be submitted with the application. The student normally will be expected to have had at least 18 semester hours in psychology, including statistics and research methods, or their equivalents.

The program of study is designed primarily for the student who seeks the Ph.D. degree. Students interested in pursuing a terminal master's degree should not apply for admission. However, all Ph.D. candidates must complete requirements for the M.A. degree.

Requirements for the Master of Arts Degree: *Clinical* – minimum 30 hours. A student who seeks only the Master of Arts degree will be advised on selection of courses that will meet specific objectives. The student must complete 24 semester hours of course work and submit a research thesis. The thesis should be finished no later than the end of the second year of study.

Experimental – minimum 30 hours. A student who seeks only the Master of Arts degree must complete 24 hours of courses, including the following required courses: PSYC 4123, PSYC 5013, PSYC 5063, PSYC 5113, PSYC 5123, PSYC 5133, PSYC 5143, PSYC 523V (2 hours), and PSYC 6133. In addition, the student must submit a research thesis.

Requirements for the Doctor of Philosophy Degree:

1. Students in the experimental psychology program must fulfill all the requirements for the Master of Arts degree and take four 6000-level experimental psychology seminars.
2. The clinical student must take the following required courses: PSYC 5013, PSYC 5033, PSYC 5043, PSYC 5053, PSYC 5063, PSYC 5073, PSYC 5113, PSYC 5133, PSYC 5143, PSYC 5163, PSYC 5313, PSYC 6133 (or PSYC 4123), PSYC 6163, PSYC 6213, and PSYC 6223.
3. The clinical student must take a clinical practicum each semester on campus. The student must complete a one-year pre-doctoral internship at an approved facility. It may precede or follow completion of the dissertation at the discretion of the advisory committee, but it must be completed prior to formal granting of the degree.
4. All students must pass a written candidacy examination at a time recommended by the student's advisory committee.
5. All students must complete a dissertation demonstrating independent scholarship and originality in research and its oral defense.

The candidacy examination focuses upon methods characteristic of the field and upon specific content areas that are appropriate for each student. This examination may not be given until the M.A. thesis has been accepted, and it must be completed before dissertation research is begun. The final oral examination deals primarily with the dissertation research.

Psychology (PSYC)

PSYC4013 Exceptional Children (Irregular) Study of children whose development follows atypical patterns, including for example, the mentally deficient, the physically and emotionally handicapped. Prerequisite: PSYC 2003. (Same as PSYC 4013I)

PSYC4023 Adulthood and Aging (Irregular) Psychological factors occurring from young adulthood through old age. Emphasis on cognitive, personality, physical, and psychological factors. Prerequisite: PSYC 2003. (Same as PSYC 4023I)

PSYC4033 Educational Psychology (Irregular) Psychological theories and concepts applied to the educational process. Investigates the learner and instructional variables in a wide range of educational settings. Prerequisite: PSYC 2003. (Same as PSYC 4033I)

PSYC4053 Psychological Tests (Irregular) Nature and theory of individual and group tests of intelligence, personality, interests, and attitudes. Prerequisite: PSYC 2013. (Same as PSYC 4053I)

PSYC4063 Psychology of Personality (Irregular) Development and nature of the normal personality. Prerequisite: PSYC 2003.

PSYC4073 Psychology of Learning (Fa) Basic principles of learning showing how these principles are derived from experimental studies and how they are applied to explain more complex forms of behavior. Prerequisite: PSYC 2003.

PSYC4123 Perception (Irregular) Survey of principles and theories of sensation and perception. Content covers the classical senses with emphasis on integrating physical, physiological, and psychophysical evidence concerning the operation of sensory system in humans and other animals. Prerequisite: PSYC 2003.

PSYC4133 Behavior Modification (Irregular) Introduction to the basic principles of behavior modification and contingency management. Presents procedures of conditioning, reinforcement, token economy and self-control of individuals and groups in a variety of settings with emphasis on discussions of research and ethics. Prerequisite: PSYC 2003.

PSYC4143 History and Systems of Psychology (Fa) Examination of the concepts, methods, and systems which have contributed to the development of modern psychology. Prerequisite: PSYC 2003.

PSYC4183 Physiological Psychology (Fa) Examination of the biological basis of behavior. Surveys neuroanatomy, neurophysiology, and neuropharmacology, and then investigates how the nervous system produces various types of behavior. Prerequisite: PSYC 2003.

PSYC4193 Comparative Psychology (Sp) Similarities and differences in behavior across different species, including man. Special reference is made to principles concerning the organisms adjustment to its environment. Prerequisite: PSYC 2003.

PSYC5013 Advanced Developmental Psychology (Sp) Critical examination of the research relevant to the psychological factors influencing the growth processes of the individual from birth to maturity. Prerequisite: PSYC 4073.

PSYC5023 Neuropsychological Assessment (Irregular) Introduction to the principles, techniques, and tools of assessment in clinical neuropsychology. Includes training in the interpretation, integration, and reporting of results. Prerequisite: PSYC 5043; enrollment in the Psychology graduate program.

PSYC5033 Psychopathology (Fa) Psychological and somatic factors contributing to pathological behavior. Interrelations of these factors will be analyzed in terms of how they lead to differential abnormal states. Prerequisite: PSYC 3023; enrollment in the Graduate Program in Psychology, or consent.

PSYC5043 Assessment of Intellectual and Cognitive Abilities (Fa) Training in the theory, administration and interpretation of individual tests of intelligence and mental ability. Prerequisite: PSYC 4053; Enrollment in the Psychology Graduate Program.

PSYC5053 Advanced Personality Assessment and Clinical Diagnosis (Fa) Guidelines for using standardized instruments and structured interviews in the diagnosis and clinical assessment of major psychological disorders. Includes training in the interpretation, integration, and reporting of results. Prerequisite: PSYC 5043 and PSYC 5163.

PSYC5063 Advanced Social Psychology (Sp) Theory, methodology, and contemporary research in the major areas of social psychology. Topics include attitude theory and measurement, group processes, social and cultural factors.

PSYC5073 Introduction to Clinical Practice: Core Skills and Ethical Guidelines (Sp, Fa) (Formerly PSYC 507) An introduction to clinical practice focusing on a) interview methods and techniques and b) ethical principles and guidelines. Prerequisite: Enrollment in the Psychology graduate program.

PSYC5113 Theories of Learning (Fa) Major concepts in each of the important theories of learning. Prerequisite: PSYC 4073.

PSYC5123 Cognitive Psychology (Even years, Sp) Contemporary theories and research on human information processing including topics such as memory, language, thinking, and problem solving.
PSYC5133 Inferential Statistics for Psychology (Fa) Inferential statistics, including representative parametric tests of significance. Special emphasis on analysis of variance, covariance, and component variance estimators as applied to psychological research. Prerequisite: PSYC 2013 or STAT 2013. (Same as STAT 5133)
PSYC5143 Advanced Descriptive Statistics for Psychology (Sp) Special correlation techniques followed by a survey of representative nonparametric tests of significance. Major emphasis on advanced analysis of variance theory and designs. Prerequisite: PSYC 5133. (Same as STAT 5143)
PSYC5163 Personality: Theory & Disorder (Sp) An introduction to empirically based theories of personality and personality disorders with an emphasis on clinical application and intervention. Prerequisite: Enrollment in the Psychology graduate program or consent.
PSYC523V Research Practicum (Sp, Fa) (1-3) Presentation, evaluation, and discussion of on-going research proposals. Required of all experimental graduate students in the first 2 years of their program.
PSYC5313 Introduction to Clinical Science: Research Design and Ethical Guidelines (Fa) Provides a) guidelines for designing and conducting empirical research in clinical psychology, b) ethical principles that regulate clinical research, and c) supervised opportunities to develop a clinical research proposal. Prerequisite: Enrollment in the Psychology graduate program.
PSYC600V Master's Thesis (Sp, Su, Fa) (1-6)
PSYC602V Seminar: Teaching Psychology (Sp, Fa) (1-3) Survey of the literature on teaching of psychology in college. Includes: planning the course, method, examining and advising students. Prerequisite: teaching assistant.
PSYC607V Clinical Practicum III (Sp, Fa) (1-3) Provides supervised experience in the application of the more complex and lesser known psychodiagnostic techniques and training and experience in psychotherapeutic techniques with the more severe functional disorders. Level of responsibility and independence to increase in 608V. Prerequisite: PSYC 5073; Enrollment in the Psychology graduate program.
PSYC608V Clinical Practicum IV (Sp, Fa) (1-3) Provides supervised experience in the application of the more complex and lesser known psychodiagnostic techniques and training and experience in psychotherapeutic techniques with the more severe functional disorders. Prerequisite: PSYC 5073; enrollment in the Psychology graduate program.
PSYC609V Clinical Graduate Seminar (Sp, Fa) (1-3) Provides intensive coverage of specialized clinical topics. Open to all graduate students. May be repeated for 3 hours.
PSYC611V Individual Research (Sp, Su, Fa) (1-18)
PSYC6133 Advanced Physiological Psychology (Fa) Examination of the biological basis of behavior, with emphasis on underlying neural mechanisms.
PSYC6163 Psychotherapy (Sp) A conceptual overview of psychotherapy, with an emphasis on a) common mechanisms, and b) cognitive and interpersonal approaches. Prerequisite: PSYC 5033.
PSYC6173 Clinical Child Psychology (Even years, Sp) Intensive study of psychopathology, assessment, and treatment of children. Broad survey with emphasis on theory, practice, and research from a developmental perspective. Prerequisite: PSYC 5033 and PSYC 5043 and PSYC 5053.
PSYC6183 Group Psychotherapy (Even years, Fa) Examination of theory, research, and practice in group psychotherapy. Prerequisite: Enrollment in the Psychology graduate program.
PSYC6203 Marital and Family Psychotherapy (Odd years, Fa) Examination of theory, research, and practice in marital and family psychotherapy. Includes supervised clinical experiences. Prerequisite: Enrollment in the Psychology graduate program.
PSYC6213 Behavior Therapy (Even years, Fa) Provides clinical experience and training in the major behavior modification technique. Includes also a critical evaluation of theory, research, and issues in the area. Prerequisite: Enrollment in the Psychology graduate program.
PSYC6223 Diversity Issues in Clinical Psychology (Sp) The impact of clients' diversity on assessment, treatment, and research in clinical psychology. Broad coverage with an emphasis on implications for clinical practice. Prerequisite: Enrollment in the Psychology graduate program or consent.
PSYC6233 Professional Issues in Clinical Practice (Irregular) Examination of major issues the professional practice of clinical psychology, including regulations governing licensure, the business of behavioral health care, and the role of clinical psychologists in the courts. Prerequisite: Enrollment in the Psychology graduate program.
PSYC6323 Seminar in Developmental Psychology (Odd years, Fa) Discussion of selected topics in the area of human development. Emphasis will be on a review of current theory and empirical research. Topics selected for discussion could range from early development (child psychology), to later development (psychology of adulthood and aging-gerontology), to current attempts to integrate the field (life-span developmental psychology).
PSYC6353 Seminar in Learning/Memory/Cognition (Odd years, Sp) Discussion of selected topics in learning, memory, or cognition. Emphasis on current theory and empirical research. Topics selected for discussion may be in the areas of learning, memory, problem solving, or language.
PSYC6373 Seminar in Personality and Social Psychology (Fa) Discussion of selected topics in social psychology and personality. Current theoretical positions and recent research findings are emphasized. Topics selected for discussion will be in areas of intrapersonal processes, interpersonal processes, group processes or any of various areas of personality.
PSYC6413 Seminar in Physiological Psychology (Odd years, Sp) Discussion of selected topics in physiological psychology. Emphasis will be on a review of current theory and empirical research. Each offering of the seminar will examine the biological basis of a specific aspect of behavior, utilizing both animal and human data.
PSYC698V Field Work (Sp, Su, Fa) (1-3) Provides academic credit for field work in multidisciplinary setting, involving supervised experiences in assessment and psychotherapy. May be repeated for 99 hours.
PSYC699V Clinical Psychology Internship (Sp, Su, Fa) (1-3) Supervised experience in a multidisciplinary setting of assessment and psychotherapy. May be repeated for 99 hours.
PSYC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

PUBLIC ADMINISTRATION

See Political Science, page 150.

PUBLIC POLICY (PUBP)

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Web: http://policy.uark.edu/

Degree Conferred:

Ph.D. (PUBP)

This interdisciplinary policy program has a strong emphasis on public affairs and will train policy leaders to directly address the policy issues of the people of Arkansas, the region, and the nation. The program provides a vehicle for the consideration of policy issues by students, faculty, and the larger community. Therefore, students and faculty will participate in colloquia, projects, and research that contribute to successful public policy. Leadership and administrative skills are included in the course of study, along with a strong emphasis on policy analysis that recognizes the complex nature of policy problems. Such an analytical approach will prepare students for work with governmental, educational, professional, and private sector experts who must cooperate in shaping public policy.

Areas of Concentration: Agricultural Policy, Community Development and Growth Management, Disability Policy, Education Policy, Environmental Policy, Family Policy, Health Policy, Public Policy Leadership, Recreation Policy, Transportation Policy. (Other specialization options are possible. Contact us for more information.)

Primary Areas of Faculty Research: See areas of concentration.

Prerequisites to Degree Program: Applicants must have a master's degree completed prior to beginning the doctoral program. The master's degree should be relevant to the policy area of their specialization. For example, students with a master's in geology might enter the agriculture policy specialization but not the family policy specialization. If students enroll in classes designated to address deficiencies, they may enter a specialization outside of their master's area. These decisions will be made by the program faculty. An application should include identification of the applicant's objectives and supportive background information including three letters of recommendation evaluating the applicant's ability to successfully pursue a Ph.D. A GPA of at least a 3.00 on a 4-point scale for all graduate course work is required. Admission is competitive and based on the specialization and availability of an appropriate faculty mentor. Two students with identical packets may receive different decisions.

Requirements for the Doctor of Philosophy Degree: In addition to the general requirements of the Graduate School, the doctoral program consists of a minimum of 63 hours including:

Core requirements, 23 hours:
PUBP 6001 Pro-Seminar
PLSC 5163 Public Policy
SOCI 5133 The Community
Economics and Policy (3 hours selected from approved courses)
PUBP 6023 Law and Policy
PUBP 6103 Policy and Leadership Seminar
PUBP 6113 Agenda Setting and Policy Formation
PUBP 6134 Capstone Seminar in Public Policy

Methods, 11 hours:
PUBP 6012 Legal Research
EDFD 6533 Qualitative Research
Advanced Research Methods (selected from approved courses)

Electives in area of concentration, 12 hours: See program director for concentration requirements.

Dissertation Research, 18 hours: (PUBP 700V)

The following graduate courses, or their equivalent, in Research Statistics and Research Methods are considered prerequisites:

Social Research Methods (for example: Research Methods in Political Science, Research Methods in Education, Advanced Social Research in Sociology.)

Statistics for Research (for example: Applied Data Analysis in Sociology, Inferential Statistics for Psychology, Statistical Methods in Statistics.)

After completing approximately two years of graduate study, and at least one year before completing all other requirements, the prospective candidate must take candidacy examinations covering both core and specialization studies. The examinations will be both written and oral. All students must demonstrate a capacity for research by writing an original dissertation on a topic in their area of concentration. The student's final examination will be an oral defense of the dissertation.

Students should also be aware that the program in public policy has a residency policy that is different from that of the Graduate School. Students shall have met the residency requirement in the public policy Ph.D. program if they meet the following criteria:

1. After admission, the student must register for a minimum of twelve hours per year for a minimum of two years (including fall, spring and summer semesters); and

2. The student must make satisfactory progress including positive residency evaluations in his or her annual review.

Public Policy (PUBP)

PUBP6001 Pro-Seminar (Fa) An introduction to the field of public policy and to the program. The seminar will address topics such as the meaning of public policy, policy research, the dissertation process, and particular issues of public policy concern. Prerequisite: admission to program.

PUBP6012 Legal Research (Fa) This course examines primary and secondary level materials and techniques for effective legal research in print and electronic formats.

PUBP6023 Law and Public Policy (Sp) This course focuses on the legal aspects of public policy, with emphasis on the regulatory process and its legal constraints. Also considered are the process of administrative decision making, judicial review, legislative oversight, and public access to government information. Co- or Prerequisite: PUBP 6012.

PUBP6103 Policy Leadership Seminar (Fa) This interdisciplinary seminar will explore the relationship between policy, public administration, and organizations in the community. Stakeholder groups will be considered as part of the newer approaches to practice-driven scholarship. The class will examine innovative approaches to decision making, strategic management and policy leadership in complex interorganizational and inter agency settings.

PUBP6113 Agenda Setting and Policy Formulation (Sp) This course is a seminar on agenda and policy formation focusing on the classic theoretical and empirical literature. The course is designed to introduce graduate students to a variety of theories typologies, concepts, and ideas relating to the study of public policy.

PUBP612V Research Problems in Policy (Sp, Su, Fa) (1-6) May be repeated for 6 hours.

PUBP6134 Capstone Seminar in Public Policy (Sp) This course is intended to integrate various policy interests in a specific community based project.

PUBP6301 Policy and Administrative Ethics (Sp) This class will introduce the broad subject area of ethics in public administration and public policy.

PUBP700V Doctoral Dissertation (Irregular) (1-9) Prerequisite: candidacy. May be repeated for 18 hours.

RECREATION (RECR)

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Degrees Conferred:

M.Ed., Ed.D. (RECR)

Areas of Concentration: Recreation management, therapeutic recreation, and sports management.

Prerequisites to Degree Program: For acceptance to the master's degree programs, the program area requires, in addition to the general requirements for admission to the Graduate School, an undergraduate degree in recreation or a related field and the following admission standards: an overall undergraduate GPA of 3.00 or if the overall undergraduate GPA is between 2.70 and 2.99, the student must have a 3.00 GPA on the last 60 hours of undergraduate course work (excluding student teaching), or a minimum GRE score of 1000 on the verbal and quantitative parts of the general test.

Requirements for the Master of Education Degree: Candidates for the Master of Education degree in recreation must complete 27 semester hours of graduate work and a thesis (6 hours) or 33 semester hours without a thesis in the recreation management and therapeutic recreation concentrations. Candidates for a master's degree in sport management must complete 30 semester hours of graduate course work and a thesis or 36 semester hours without a thesis. In addition to the program requirements listed below, all candidates must successfully complete a written comprehensive examination.

Recreation Management: (33 hours)
Required Research Component (6 hours)
EDFD 5393 Statistics in Education and Health Professions, or
EDFD 6403 Educational Statistics and Data Processing
HKRD 5353 Research in HKRD

Required Courses (18 hours)
RECR 5813 Principles of Recreation
RECR 5843 Tourism
RECR 5853 The School and Community Recreation Program
RECR 5883 Recreation Service Promotion
HKRD 5873 Leadership in HKRD Services
HKRD 5893 Public & Private Finance in HKRD
Approved Electives (9 hours)
Must include RECR 605V (Independent Study - master's degree project), or RECR 600V Master's Thesis

Therapeutic Recreation: (33 hours)
Required Research Component (6 hours)
EDFD 5393 Statistics in Education and Health Professions, or

EDFD 6403 Educational Statistics and Data Processing
HKRD 5353 Research in HKRD

Required Courses (21 hours)
RECR 4093 Fundamentals of Therapeutic Recreation
RECR 5473 Techniques in Therapeutic Recreation
RECR 5483 Treatment Planning in Therapeutic Recreation
RECR 5493 Trends and Issues in Therapeutic, Recreation
RECR 5813 Principles of Recreation
RECR 5853 The School and Community Recreation Program
RECR 5893 Field Work in Recreation

Approved Electives (6 hours)
Must include RECR 605V (Independent Study - master's degree project), or RECR 600V Master's Thesis

Sports Management: (36 hours)
Required Research Component (6 hours)
EDFD 5393 Statistics in Education and Health Professions, or
EDFD 6403 Educational Statistics and Data Processing
HKRD 5353 Research in HKRD

Required Courses (24 hours)
RECR 5293 Sport Management
KINS 5753 Research in Sport Psychology, or
MGMT 5343 Managerial Communication
HKRD 5893 Public & Private Finance in HKRD
RECR 6533 Legal & Political Aspects
HKRD 5873 Leadership in HKRD Services
HKRD 5883 Sports Facilities Management
RECR 5813 Principles of Recreation
RECR 5883 Recreation Service Promotion

Approved Electives (6 hours)
RECR 574V Internship, and
RECR 5853 The School & Community Recreation Program, or
RECR 600V Master's Thesis

Area of Concentration: The program prepares qualified students for professional competence and service in the area of recreation.

Prerequisites for Acceptance to the Ed.D. Degree Program: The applicant must have completed a master's degree or its equivalent in recreation or a closely-related field and meet general admission requirements of the Graduate School. An application should include identification of the applicant's objectives, supportive background information including three letters of recommendation supporting the applicant's ability to successfully pursue an Ed.D. in Recreation, a GPA of at least 3.00 on all graduate course work, and an acceptable score on the Graduate Record Examinations (GRE). Additional prerequisites may be prescribed after review of application materials. Furthermore, applicants who present a GRE score of 1200 or greater on the combined verbal/quantitative portions, a GRE writing score of 5.5. or greater, an overall GPA of at least 3.85 and faculty approval may apply for admission to the Ed.D. Recreation program after completion of their bachelor's degree.

Requirements for the Doctor of Education Degree: This program is designed for those wishing to prepare for college, university, or community college positions in recreation. The program must include the general degree requirements of the College of Education and Health Professions in addition to courses selected with the approval of the candidate's advisory committee.

Recreation (RECR)

RECR4093 Fundamentals of Therapeutic Recreation (Sp) An introduction to the field of therapeutic recreation. This survey encompasses history, philosophy, programs, treatment, research, populations served, and professional aspects of therapeutic recreation practice. Requirements are different for graduate credit.
RECR4263 Aquatic Facilities Management (Irregular) Prepares students to organize, administer, and supervise aquatic facilities, staff, and programs in school, community, and camp settings.
RECR5003 Graduate Prerequisites (Fa) Gives students entering a recreation degree program with no course background in recreation the necessary understanding of the recreation field. This course will not count toward a graduate degree in recreation.
RECR5213 Social Psychology of Recreation (Irregular) Application of social psychological theory to leisure, recreation, and travel behavior. Additional emphasis placed on the contribution of this theory to current practice in the recreation and tourism management field.
RECR5223 Applied Leisure Behavior (Irregular) Examines antecedents and consequences of leisure behavior from a social psychological perspective. Emphasis on assisting recreation managers to facilitate quality leisure experiences in their agency programs.
RECR5273 The Intramural Sports Program (Odd Years, Fa) Historical development, aim and objectives, organization, administration, units of competition, program of activities, schedule making, scoring plans, rules and regulations, awards, and special administrative problems.
RECR5293 Sports Management (Fa) Deals primarily with high school athletics and considers historical development, objectives, controlling agencies, eligibility and contest regulations, local organization and administration, staff program, finances, inventories, facilities and equipment, safety, legal aspects, awards, publicity, and public relations.
RECR5433 Medical Aspects of Disability (Irregular) Orientation to medical and medically related aspects of various disabling conditions with emphasis on the severely disabled. (Same as RHAB 5433)
RECR5453 Psychological Aspects of Disability (Irregular) Intensive study of the psychological aspects of adjustment to atypical physique and prolonged handicapping condition. (Same as RHAB 5453)
RECR5473 Techniques in Therapeutic Recreation (Irregular) Advances the student's understanding and application of therapeutic recreation techniques. It provides knowledge and the opportunity to apply skills for the student to gain competencies necessary for the provision of therapeutic recreation services. Prerequisite: RECR 4093.
RECR5483 Treatment Planning in Therapeutic (Irregular) Prepares students with the skills and understanding to apply the "TR Process" (assessment, planning, implementation, evaluation) in the development of individual client treatment plans in Therapeutic Recreation. Prerequisite: RECR 4093.
RECR5493 Trends and Issues in Therapeutic Recreation (Irregular) Advances the student's knowledge of issues and concerns that moderate therapeutic recreation services to the client. The student is expected to critically examine and discuss each issue in an effort to develop a sound, practical philosophy of therapeutic recreation. The ultimate goal is to prepare the student to enter the profession confident in his or her ability to provide exemplary services. Prerequisite: RECR 4093.
RECR560V Workshop (Irregular) (1-3) May be repeated for 3 hours.
RECR574V Internship (Irregular) (1-3)
RECR5813 Principles of Recreation (Su) Considers history, philosophy, current trends, basic issues, and fundamental principles of recreation. Using these principles as basic criteria, students make critical appraisals of current practices in organization and administration of recreation programs, program content, leadership methods, and evaluative procedures.
RECR5823 Outdoor Recreation Program (Su) Considers the values and scope of outdoor recreation programs. Attention is given to the influence of geographical factors, land use, standards, economics, and legislation on program planning and operation.
RECR5833 Recreation for Special Populations (Irregular) Skills, knowledge, and concepts within recreation which are appropriate to planning and implementing recreation programs and services for the handicapped.
RECR5843 Tourism (Even Years, Fa) Explores major concepts of tourism to discover what makes tourism work, how tourism is organized, and its social and economic effects.
RECR5853 The School and Community Recreation Program (Sp) Nature, background, significance, and trends in recreation in the school and community. Attention is given to departmental organization, administrative practices, program financing, personnel, safety, and legal aspects.
RECR5863 Operation of Commercial Recreation Enterprise (Irregular) Explores the operational requirements of commercial recreation enterprises. Students analyze the current status and future prospects of various recreational enterprises with respect to entry opportunities, operational and financial requirements, and market orientation.
RECR5883 Recreation Services Promotion (Fa) Examines specific strategies for promoting recreation programs in the local community.
RECR5893 Field Work in Recreation (Sp, Su, Fa) Provides practical work experience in recreation programs and the opportunity to study special programs under the supervision of specialists.
RECR599V Seminar (Irregular) (1-6)
RECR600V Master's Thesis (Sp, Su, Fa) (1-3)
RECR605V Independent Study (Sp, Su, Fa) (1-3) May be repeated for 3 hours.
RECR612V Directed Reading in Recreation (Sp, Su, Fa) (1-3) Critical analysis of literature in the area of recreation.
RECR6533 Legal and Political Aspects (Sp) An overview of major legislation affecting HKRD professions; how to operate within these laws; and methods for influencing new legislation. Also discusses political aspects of professions both outside and inside government agencies.
RECR674V Internship (Sp, Su, Fa) (1-3) Students will learn diverse teaching techniques and implement them in an on-going undergraduate recreation class serving as the teaching laboratory. The 'what "when" and "how" relative to integrating various teaching techniques with specific content areas in the class will be explored by both the student and the

instructor.
RECR699V Seminar (Irregular) (1-6) Discussion of selected topics and review of current literature in the recreation field. Prerequisite: advanced graduate standing.

REHABILITATION (RHAB)

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- University Professor Roessler
- Professors Anderson, Watson
- Research Professors Boone, Schroedel
- Associate Professor Koch
- Assistant Professor Williams
- Research Assistant Professors Cochran, Hagen-Foley, Sabik

Degrees Conferred:

M.S., Ph.D. (RHAB)

Areas of Concentration: In addition to the general program in vocational rehabilitation counseling, three specialty emphasis tracks are offered: rehabilitation job development and job placement; rehabilitation and independent living; and rehabilitation of individuals who are deaf or hard of hearing. (NOTE: The deaf-or-hard-of-hearing track has suspended acceptance of new students for the 2006-07 academic year.)

Prerequisites to the Degree Program: For acceptance into the master's degree program in rehabilitation, the program stipulates, in addition to the general requirements of the Graduate School, an undergraduate degree in a social or behavioral science, or other related fields.

Requirements for the Master of Science Degree in Rehabilitation: Candidates for the general master's degree and all three tracks must complete 48 semester hours (39 of which are core courses). Students select the practicum, internships, and electives with the permission of their adviser, according to their specialty emphasis track. A thesis may be included within any of the three tracks.

The general program in vocational rehabilitation (48 hours) stresses the skills of case management and vocational counseling with people who are disabled. The rehabilitation job development and job placement track emphasizes case management and life planning for people with disabilities who may not be ready for vocational planning. The rehabilitation of individuals who are deaf or hard of hearing track emphasizes the skills of case management and vocational rehabilitation counseling with hearing-impaired persons. All students in the vocational rehabilitation program complete a practicum and internship in a vocational rehabilitation setting specific to their emphasis track; i.e., a student in the rehabilitation and independent living track completes a practicum and internship in an independent living center, whereas a student in the rehabilitation of individuals who are deaf or hard of hearing track completes a practicum and internship in a vocational rehabilitation setting that serves people who are hearing-impaired.

Prerequisites to the Doctor of Philosophy Degree Program: The applicant must have completed a master's degree or its equivalent in rehabilitation counseling or a closely related discipline and must meet the general admission requirements of the Graduate School. Applicants are encouraged to have had three years of successful experience related to the applicant's degree and career objectives. After gaining admission to the Graduate School, the applicant must be accepted by the Rehabilitation Education faculty. The review process consists of an interview and evaluation of the applicant's personal, social, and academic attributes, and includes three letters of reference. A prospective candidate must present a graduate GPA of 3.50 or better and a score of at least 1500 on three parts of the Graduate Record Examinations (GRE). Additional prerequisites may be prescribed after review of the applicant's materials.

Requirements for the Doctor of Philosophy Degree: A minimum of 60 semester hours, including 18 hours of dissertation, must be taken from the University of Arkansas after admission into the Ph.D. program. A doctoral advisory committee will be established by the student, in consultation with the program chair, during the first semester of enrollment. The nature of the student's program will vary depending on the student's career objectives. The degree program also requires successful completion of candidacy examinations, an acceptable doctoral dissertation, and oral defense of the dissertation. These last requirements are described elsewhere in this catalog.

Curriculum Core Requirements
RHAB 6213 Advanced Psychosocial Aspects of Disability
RHAB 6233 Employment Practices and Interventions
RHAB 6243 Advanced Rehabilitation Research
RHAB 699V Seminar Research and Statistical Requirements
A minimum of 15 hours approved by the doctoral advisory committee.
Field of Study
The student, in consultation with the doctoral advisory committee, will identify further course work comprising a field of study in rehabilitation.

Rehabilitation Education (RHAB)

RHAB5333 Counseling Persons Who Are Deaf or Hard of Hearing (Sp, Fa) Focuses on the application of basic principles underlying all forms of therapeutic interaction to professional counseling practices with individuals who are deaf or hard of hearing.
RHAB534V Supervised Rehabilitation Counseling (Sp, Su, Fa) (1-3) Gives the student practice in counseling under supervision with rehabilitation clients in selected settings and agencies.
RHAB5353 Hearing Impairment and Human Behavior (Sp, Fa) Focuses on an interdisciplinary study of the impact for profound hearing loss on the educational, psychological, social, and vocational functioning of persons who are deaf or hard of hearing.
RHAB5363 Employer Relations and Placement Practicum (Sp, Su, Fa) Students address the placement needs of rehabilitation agencies and their clients by implementing the RehabMark approach to employer development. Prerequisite: RHAB 5493.
RHAB5373 Multicultural/Gender Issues in Rehab (Su) This course examines multicultural and gender issues of importance to rehabilitation practice and research, including study of women and men with disabilities within different minority cultures. The course uses a power analysis and a minority model of disability as a basis for understanding the relationship between disability, gender, race and ethnicity.
RHAB5403 Rehabilitation Counseling (Fa) Counseling theories and techniques applied to the rehabilitation counseling setting. Includes an experiential component with critical analyses.
RHAB5413 Group Counseling in a Rehabilitation Setting (Su) This course combines theoretical and experiential components of group counseling in settings unique to the practice of rehabilitation counseling. Prerequisite: rehabilitation counseling or counseling theory.
RHAB5423 Vocational Rehabilitation Foundations (Fa) Survey of the philosophy of vocational rehabilitation, including history and legislation.
RHAB5433 Medical Aspects of Disability (Sp) Orientation to medical and medically related aspects of various disabling conditions with emphasis on the severely disabled. (Same as RECR 5433)
RHAB5443 Rehabilitation Case Management (Sp) Counseling process in the rehabilitation setting. Focusing upon effective counseling strategies, representative cases, and effective case management methods.
RHAB5453 Psychological Aspects of Disability (Sp) Intensive study of the psychological aspects of adjustment to atypical physique and prolonged handicapping condition. (Same as RECR 5453)
RHAB5463 Independent Living and Community Adjustment (Fa) Study of the

problems and practices involved in developing and maintaining independent living rehabilitation programs for people who are disabled physically, developmentally, and mentally.
RHAB5473 Placement of Persons with Disabilities (Su) Focuses on placement theory and practice as they apply to persons who experience disabilities. Special attention is given to RehabMark approach.
RHAB5483 Rehabilitation Counseling Research (Fa) An indepth examination of rehabilitation research methodology and issues to prepare students to critically evaluate and use rehabilitation counseling research in their professional practice.
RHAB5493 Vocational Evaluation and Adjustment (Sp) An indepth examination of theories and techniques related to evaluation of vocational potential and work adjustment of people with disabilities.
RHAB568V Rehabilitation Research (Sp, Su, Fa) (3-6) Practical experience under the supervision of a faculty member in conducting rehabilitation research in a laboratory or field setting.
RHAB574V Internship (Sp, Su, Fa) (1-9)
RHAB599V Seminar (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
RHAB605V Independent Study (Sp, Su, Fa) (1-18)
RHAB6203 Disability Policy in the U.S. (Fa) An analysis of public policy approaches to disability in the U.S. Examines the political and philosophical origins of disability policy; reviews major disability legislation and its effects on policy stakeholders; describes recent initiatives; and analyzes evolution of disability policy within context of changing societal, economic, and political conditions.
RHAB6213 Advanced Psychosocial Aspects of Disability (Fa) A theoretical and applied study of techniques that enable people to cope with 2 major life events: disability and unemployment.
RHAB6233 Employment Practices and Interventions (Sp) An intensive study of the employment experiences of workers with disabilities with emphasis on disincentives and barriers to employment and interventions to enable people with disabilities to participate in employment. Prerequisite: RHAB 5493 or equivalent.
RHAB6243 Advanced Rehabilitation Research (Sp) An advanced doctoral level course to facilitate the application of scientific values, research skills, and behavior to the generation of rehabilitation knowledge and problem solving.
RHAB625V Teaching Internship in Rehabilitation (Sp, Su, Fa) (1-18) Graduate teaching experience in the rehabilitation counseling curriculum. Under the supervision of a faculty member, will participate in the development of syllabi, course materials and examinations. Will team teach graduate rehabilitation courses with the faculty member. May be repeated for 18 hours.
RHAB626V Practicum Supervision (Su) (1-6) (Formerly RHAB 6263) The study and practice of supervising master's rehabilitation counseling students in a clinical practicum setting. Prerequisite: doctoral standing. May be repeated for 3 hours.
RHAB6273 Administration & Supervision in Rehabilitation Settings (Odd years, Fa) An examination of the basic knowledge and skills required to perform supervisory and administrative functions in rehabilitation settings. Includes a review of applicable laws, management theory, issues in human resource development, burnout, and exposure to organizational structure and function. Prerequisite: master's or doctoral standing.
RHAB675V Internship (Sp, Su, Fa) (1-18) Advanced supervised practice in a rehabilitation setting.
RHAB699V Seminar (Sp, Su, Fa) (1-18) Discussion of pertinent topics and issues in the rehabilitation field. Prerequisite: advanced graduate standing. May be repeated for 18 hours.
RHAB700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

REHABILITATION, HUMAN RESOURCES, AND COMMUNICATION DISORDERS, DEPARTMENT OF (RHRC)

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- University Professor Roessler
- Professors Anderson, Biggs, Daugherty, Dutton, Hinton, Shadden, Thompson (C.), Watson
- Research Professors Boone, Schroedel
- Associate Professors DeVore, Koch, Nafukho, Orr, Thompson (D.), Toner
- Assistant Professors Banks, Beck, Brooks, Hagstrom, Mungania, Williams
- Research Assistant Professors Cochran, Hagen-Foley, Sabik
- Research Associate Aslin
- Instructor McGehee

Degrees Conferred:

M.A.T.in Vocational Education (VOED) (See Vocational Education)
M.Ed. in Workforce Development Education (See College of Education and Health Professions; Adult Education)
M.S. in Communication Disorders (CDIS) (See Communication Disorders)
M.S., Ph.D. in Rehabilitation (RHAB) (See Rehabilitation)
Ed.D. (ADED) (See College of Education and Health Professions; Adult Education)
Ed.D. (VOED) (See College of Education and Health Professions; Vocational Education)
(An Ed.D. in Workforce Development Education is pending approval by the Arkansas Department of Higher Education.)

VOCATIONAL EDUCATION / ADULT EDUCATION (VAED)

See Adult Education, page 46.

SECONDARY EDUCATION (SEED)

Tom Smith
Head, Department of Curriculum and Instruction
214 Peabody Hall
479-575-4209
E-mail: tecsmith@uark.edu

Web: http://www.uark.edu/depts/coehp/CIED.htm/

- Professors Besonen, Farah, Taylor
- Associate Professor Wavering
- Assistant Professor Lincoln

Degrees Conferred:

M.A.T., M.Ed. (SEED)
Ed.S. (EDUC)

The Master of Arts in Teaching (M.A.T.) is a degree program of 33-34 semester hours. The M.A.T. degree is the initial teacher licensure program for students at the University of Arkansas.

Prerequisites to the M.A.T. Degree Program: Admission requirements for the M.A.T. degree program for initial licensure are as follows:

1. Completion of an appropriate undergraduate degree program
2. Cumulative GPA of 3.00 in the last 60 hours of the baccalaureate degree
3. Admission to the Graduate School
4. Admission to Teacher Education Program.
5. Completion of the pre-education requirements with a minimum of "C" in all courses
6. Completion of all prerequisite courses in teaching field.
7. Payment of internship fee.

Refer to list of steps and deadlines for acceptance into the Secondary Education M.A.T. program, available in the Boyer Center for Student Services.

Requirements for the Master of Arts in Teaching Degree: (Minimum 33-34 hours.)

Required MAT:

1. Computer competencies will be demonstrated by the candidate in a portfolio, or by taking ETEC 2001 Educational Technology and ETEC 2002L Educational Technology Lab, or another appropriately approved course.
2. CIED 4131 Practicum in Secondary Education. Candidates for the Secondary Education MAT program will register for this new course. The requirement for this course is 60 hours of experience with children. A minimum of 20 of these hours will be in a secondary school with the remaining hours in other youth settings. These hours must be documented by the appropriate organization.
3. Students will take CIED 3023 Survey of Exceptionalities or CIED 4023 Teaching in Inclusive Secondary Settings.

Secondary MAT courses:

CIED 5022 Classroom Management Concepts for Teachers (fall semester)
CIED 5032 Curriculum Design Concepts for Teachers (spring semester)
CIED 5042 Reading and Writing across the Curriculum (spring semester - non-English licensure only)
CIED 5052 Seminar: Multicultural Issues (spring semester)
CIED 5223 Issues and Principles of Secondary Education (summer semester)
CIED 5232 Interdisciplinary Studies (spring semester)
CIED 5243 Special Methods of Instruction I (summer semester)
CIED 5253 Special Methods of Instruction II (fall semester)
CIED 5262 Special Methods of Instruction III (spring semester)
CIED 5263 Measurement and Evaluation (fall semester)
CIED 5273 Research in Curriculum and Instruction (fall semester)
CIED 528(3) Secondary Cohort Teaching Internship (fall semester)
CIED 528(3) Secondary Cohort Teaching Internship (spring semester)
CIED 5683 Adolescent Literature (summer semester - English licensure only)

Total hours for degree 33-34

Areas of Concentration for the M.Ed.: Areas of concentration are available in art, English, ESL (English as a second language), French, German, Spanish, biology, chemistry, physics, physical science, general science, earth and space science, speech, mathematics, social studies, journalism, or combinations of the above. The M.Ed. is designed for experienced teachers who have the goal of expanding professional competence. The M.Ed. program does not meet requirements for state licensure. Students seeking state licensure should pursue enrollment in the M.A.T. program in Middle-Level Education (Grade 4 through Grade 8) or Secondary Education (Grade 7 through Grade 12).

Prerequisites to the Master of Education Degree Program:

Regular Admission

1. 2.70 grade-point average on all undergraduate courses
2. Submission of a Miller Analogies Test score
3. Graduate School admission and program area approval.

Conditional Admission

1. 2.50 grade-point average on all undergraduate courses
2. Miller Analogies Test score of 50 or above
3. Graduate School admission and program area approval.

Requirements for the Master of Education Degree: (Minimum 33 hours.) In addition to the program requirements listed below, all degree candidates must hold a valid secondary school teaching certificate and must successfully complete a written comprehensive examination and a second assessment.

M.Ed. Program Requirements: minimum 33 hours

Required Core Courses: 9 semester hours – 3 hours from each of the following three areas:

1. EDFD 5013 Research Methods in Education
   HKRD 5353 Research in HKRD
   EDFD 5393 Statistics in Education and Health Professions
2. EDFD 5373 Psych. Foundations of Teaching and Learning
   EDFD 5473 Adolescent Psychology in Education
   EDFD 5573 Life-Span Human Development
3. EDFD 5303 Historical Foundations of Modern Education
   EDFD 5353 Philosophy of Education
   EDFD 5323 Global Education

Secondary Education Courses: 9 semester hours

1. CIED 5623 The School Curriculum
2. Six semester hours selected with adviser's consent. ESL endorsement candidates must complete CIED 528V Internship and SEED 599V Seminar on ESL Integrated with Interdisciplinary Studies.

Area of Concentration: (15 semester hours must be selected from one of the following four options.)

Option 1: Advanced Certification (mathematics, science, social studies, English, etc.) 15 hours of subject area courses in field of concentration.

Option 2: Secondary Curriculum and Instruction

1. 9 additional hours in secondary education (SEED) courses
2. 6 hours selected through adviser's consent.

Option 3: Specialist Certification; 15 hours leading to certification in reading, media, curriculum, supervision, or administration.

Option 4: ESL Endorsement

1. Teacher certification in at least one field
2. CIED 5923 Second Languages Acquisition
   CIED 5933 Second Language Methodologies
   CIED 5943 Teaching People of Other Cultures
   CIED 5953 Second Language Assessment
3. SEED 599V
4. Course in multiculturalism

Requirements for the Educational Specialist Degree: (Minimum 60 hours.) This program is designed for curriculum and instruction directors, supervisors, department heads, and career teachers interested in secondary curriculum and instruction. Flexibility exists in planning the 60-hour minimum program to take into account the occupational needs and professional aspirations of each student. For instance, the continued study of secondary education may be combined with a component of educational technology, reading, or special education. In addition, each student must complete a research course (EDFD 5013 Research Methods in Education or EDFD 5393 Statistics in Education and Health Professions) and a project, and a minimum of nine graduate hours of cognate courses.

Secondary Education (SEED)

SEED560V Workshop (Irregular) (1-18) May be repeated for 18 hours.
SEED599V Seminar (Irregular) (1-18) May be repeated for 18 hours.
SEED600V Master's Thesis (Irregular) (1-6)
SEED605V Independent Study (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
SEED660V Workshop (Irregular) (1-18) Prerequisite: advanced graduate standing.
SEED674V Internship (Irregular) (1-6) Prerequisite: advanced graduate standing.
SEED680V Educational Specialist Project (Irregular) (1-18)

SECONDARY MATHEMATICS

See Mathematical Sciences.

SOCIAL WORK, SCHOOL OF (SCWK)

Joe Schriver

Director
ASUP 106
479-575-5039

Web: http://socialwork.uark.edu/

- Professors King, Schriver
- Research Associate Professor Hurd
- Associate Professors DeCoster, Reese
- Assistant Professors Christy-McMullin, Murphy, Stauss
- Clinical Assistant Professors Allen, Greer, House, Tucker

Degree Conferred:

Masters of Social Work (MSW)

Professional social workers promote human well-being by strengthening opportunities, resources, and capacities of people in their environments and by creating policies and services to correct conditions that limit human rights and the quality of life. The social work profession works to eliminate poverty, discrimination, and oppression. Guided by a person-in-environment perspective and respect for human diversity, the profession works to effect social and economic justice worldwide. The purpose of the graduate social work program at the University of Arkansas is to prepare advanced-level professional social workers as leader/practitioners with the capacity to address complex personal, social, community, and economic problems preventing so many of Arkansas' people (and people across the country and globally) from moving out of poverty to self-sufficiency. The MSW program is accredited by the Council on Social Work Education (CSWE).

Areas of Concentration: The University of Arkansas MSW program offers a life-course multi-system concentration supported by an area of emphasis chosen by each student from this list: Children, Youth, and Families; Management, Administration and Supervision; Aging; Health; or Mental Health. The life-course multi-system perspective prepares students for advanced social work practice with a range of systems (individuals, families, groups, organizations, and communities) and for practice with individuals across the life course as they interact with multiple systems.

Primary Areas of Faculty Research: End of life care; spirituality in social work; human behavior and the social environment theory; gerontology; addictions; health and health disparities; poverty reduction; human diversity; international social work; social work history; women and assets development; children and families.

Admission Requirements: Admission to the University of Arkansas Graduate School as well as admission to the School of Social Work MSW program is required. Admission requirements for the MSW program include: a baccalaureate degree with a liberal arts perspective from an accredited college or university (official transcripts must be provided); competitive GRE or MAT scores; a minimum 3.00 undergraduate GPA on a four-point scale; 2.75 for conditional admission; a personal statement of motivation for and experiences supporting admission to the MSW program; three professional reference letters (faculty, employers, supervisors); a basic statistics course; and computer literacy demonstrated through prior course work. In addition to the above requirements, for admission to the Advanced Standing program, applicants must have a bachelor's degree in social work, received during the past six years, from a school accredited by the Council on Social Work Education.

Two-year Program Option: This option is required for students without a baccalaureate degree from a program accredited by the Council on Social Work Education (CSWE). Students in the two-year option take a total of 63 credit hours. The following are required Foundation courses: SCWK 4073, 4093, 4103, 4153, 4333, 4343, 4733, 5003, 5412, 5434. The following are required Advanced courses: SCWK 5073, 6000L, 6003, 6013, 6073, 6442, 6444, 6452, and 6454.

Advanced Standing Option: Students with a baccalaureate degree from a program accredited by CSWE are eligible to apply for Advanced Standing. This option requires a total of 42 credit hours including SCWK 5013, 5442, 5444, and the advanced course work listed above for the two-year option.

Area of Emphasis Electives: Each student is required to develop an area of emphasis including three electives (nine credit hours) in one of the following areas: Children, Youth, and Families; Management, Administration and Supervision; Aging; Health; or Mental Health. Emphasis electives are chosen in consultation with the student's major adviser. Students will take at least one elective from outside the School of Social Work. Graduate social work electives include: SCWK 5143, 5153, 5163, 5173, 5183, 5193, 5213, 5223, 5233, 5253, and 5343.

Other Requirements: MSW students must complete either a thesis or a non-thesis option. The thesis option is completed in conjunction with the three-course Research and Technology sequence and is guided by the student's thesis committee.

The non-thesis option is a comprehensive examination in the form of a practice/program evaluation capstone experience culminating in a comprehensive oral examination. The practice/program evaluation project is completed in conjunction with the three-course Research and Technology sequence. The practice/program evaluation experience is guided and evaluated by a panel of faculty and senior social workers in the community who serve as the student's advisory committeee.

Social Work (SCWK)

SCWK405V Special Topics in Social Work (Irregular) (1-6) Comprehensive study of various topics of importance in contemporary social welfare and social work practice. Prerequisite: junior standing. May be repeated for 99 hours.

SCWK4073 Social Work Research and Technology I (Sp, Fa) (Formerly SCWK 3073) An overview of forms and sources of social work research including existing social data, techniques for collecting original social data, and techniques of organization, interpretation, and presentation of data. Students will also become proficient in the use of current technology for social work research and practice. Prerequisite: three hours of statistics and computer literacy.

SCWK4093 Human Behavior and the Social Environment I (Sp, Su, Fa) (Formerly SCWK 3093) Provides a conceptual framework for knowledge of human behavior and the social environment with a focus on individuals. Social systems, life-course, assets, and resiliency-based approaches are presented. Special attention is given to the impact of discrimination and oppression on the ability to reach or maintain optimal health and well-being. Prerequisite: BIOL 1543, BIOL 1541L, PSYC 2003, SOCI 2013, SCWK 2133, and SCWK 3193.

SCWK4103 Human Behavior and the Social Environment II (Sp, Fa) (Formerly SCWK 3103) This course applies the basic framework for creating and organizing knowledge of human behavior and the social environment acquired in HBSE I to the understanding of family, group, organizational, community, and global systems. Attention is given to discrimination, oppression, the impact of technology, and poverty at each system level. Prerequisite: SCWK 4093.

SCWK4153 Social Welfare Policy (Sp, Su, Fa) (Formerly SCWK 3153) Describes and analyzes the policies and services rendered by local, state, regional, national, and international agencies as well as the policy implications for social work practice. Students prepare to advocate social policy changes designed to improve social conditions, promote social and economic justice, and to empower at-risk populations. Prerequisite: PLSC 2003, SCWK 2133, and SCWK 3193.

SCWK4183 Elderly Citizen (Fa, Sp) Survey of theories of gerontology, service programs and unmet needs of the aging citizen. (Same as SOCI 3183)

SCWK4233 Seminar: Children and Family Services (Sp, Su, Fa) An examination of selected current issues in the field of children and family services through discussion, individual study, and interaction with professionals in the field.

SCWK4333 Social Work Practice I (Sp, Fa) This is the first in the sequence of practice courses introducing students to the generalist approach to micro social work. This course focuses on developing a solid foundation for practice with individuals, including learning basic communication and helping skills, values, principles, and the connection of theory to practice. Pre- or Corequisite: SCWK 4093.

SCWK4343 Social Work Practice II (Sp, Fa) This is the second course in the social work practice sequence, emphasizing theories, models, and techniques related to generalist practice with families and groups. The course elaborates on system theory as it impacts groups and families, and use of experiential teaching methods. Pre- or Corequisite: SCWK

4103. Prerequisite: SCWK 4333

SCWK4412 Field Seminar I (Sp, Su, Fa) An integrative seminar to assist students in comparing their practice experiences, integrating knowledge acquired in the classroom, and expanding knowledge beyond the scope of the practicum setting. Corequisite: SCWK 4434 and social work majors only.

SCWK4422 Field Seminar II (Sp, Su, Fa) An integrative seminar to assist students in comparing their practice experiences, integrating knowledge acquired in the classroom, and expanding knowledge beyond the scope of the practicum setting. Corequisite: SCWK 4444 (social work majors only).

SCWK4434 Social Work Internship I (Sp, Su, Fa) Arranged in connection with social service agencies. Credit is based on completion of all course objectives, including a minimum of 225 hours of field work under the supervision of a licensed social worker. Corequisite: SCWK 4412 (social work majors only). Prerequisite: SCWK 3073 and SCWK 3103 and SCWK 4333.

SCWK4444 Social Work Internship II (Sp, Su, Fa) Arranged in connection with social service agencies. Credit is based on completion of all course objectives, including a minimum of 225 hours of field work under the supervision of a licensed social worker. Corequisite: SCWK 4422 (social work majors only). Prerequisite: SCWK 4343 and SCWK 4733 and SCWK 4434 and SCWK 4432.

SCWK4633 Information Technology and the Human Services (Sp, Su, Fa) Overview of information technology and exposure to human service applications through lecture and lab experience. Prerequisite: SCWK 2133.

SCWK4733 Social Work Practice III (Sp, Fa) Students acquire and practice the skills, knowledge, and values necessary for culturally competent generalist social work practice with organizations and communities. Special attention is given to the implications of discrimination and oppression for attaining social and economic justice. Pre- or Corequisite: SCWK 4343. Prerequisite: SCWK 4103 and SCWK 4333.

SCWK5003 Foundations of Culturally Competent Social Work Practice (Fa) The purpose of this course is the acquisition and demonstration of beginning graduate-level social work values and ethics, knowledge, and skills necessary for cultural competence in work with individuals, families, groups, organizations, communities, and global contexts. A multi-systems life-course conceptual framework is used. Prerequisite: admission to the two-year or part-time MSW program.

SCWK5013 Culturally Competent Social Work Practice (Su) This course prepares advanced standing MSW students for graduate study. Students will become familiar with the mission and conceptual framework undergirding the School of Social Work, become familiar with and choose an area of emphasis, and develop beginning knowledge of diagnosis. Corequisite: SCWK 5444 and SCWK 5442. Prerequisite: admission into the advanced standing MSW program.

SCWK5073 Social Work Research and Technology II (Fa) This course includes content necessary for thesis proposal development. A significant component for this course focuses on using research tools to begin the thesis. The course provides an orientation to participatory action research, and to the scientific and systematic evaluation of service delivery and personal professional practice. Corequisite: SCWK 6000L and SCWK 6003. Prerequisite: completion of year one for two-year students or summer semester for advanced standing students.

SCWK5143 Global Social and Economic Justice and Oppression (Fa) The role and responsibilities of the social work profession are examined in an international comparative context. Particular emphasis is given to social workers' responsibilities to advance global social and economic justice and reduce human oppression through community, social, economic, and organizational development strategies. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5153 Children, Youth, and Family (Sp, Su, Fa) This course focuses on the development, revision, and impact of policy and practice in children, youth, and family services. Current issues in policy and practice will be examined. Students will interact with community agencies and utilize class assignments to advocate improvements in current policy and practice. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5163 Social Work Management, Administration and Supervision (Sp, Su) This course develops advanced skills in management, administration, and supervision in social work organizations. Emphasis is placed on developing leadership skills in ethics, budgeting, finance, resource development, information management, evaluation, staff hiring, supervision and development, and the use of technology in organizational leadership, development, and maintenance. Prerequisite: graduate standing and SCWK 5003 or SCWK 5013.

SCWK5173 Advanced Practice with Families and Couples (Fa) The purpose of this course is to provide advanced understanding of the knowledge, skills and values needed to assess and intervene effectively with traditional and non-traditional families and couples. The course will examine social systems and life-course strengths approaches to understand how families and couples function. Students will design interventions. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5183 Advanced Practice with Individuals (Sp) This course develops advanced skills in social work practice on a micro level. Students learn to analyze and compare practice models. They gain skills in selecting a practice model and integrating multiple models based on client needs. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5193 Advanced Practice and Policy in Aging (Fa) This course focuses on social work practice with, and policies for, older persons. Current, past, and future practices and policies for older persons across systems and the life course are explored. Emphasis is placed on the influences of personal, social, economic, and cultural diversity on the well-being of older persons. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5213 Advanced Practice and Policy in Mental Health (Sp) This advanced course prepares students to identify mental disorders, plan intervention strategies with clients from a strengths perspective, and understand mental health programs and policies through which services are delivered. Differential diagnosis and the impact of socioeconomic status, gender, race, and sexual orientation on diagnosis and treatment decisions are addressed. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5223 Advanced Practice and Policy in Health Care (Fa) This course examines the delivery of health care in the United States in the context of social, political, economic, ethical, and legal factors. Students gain skills for collaboration on an interdisciplinary team. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5233 Advanced Technology for Social Work (Fa) This course develops advanced skills in the critical evaluation and use of information technologies for social work practice. Emphasis is placed on using technological advances to enhance the effectiveness of social work practice across multiple systems, and developing skills for life-long learning about technologies in a rapidly changing information age. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5253 Spiritually in Social Work (Sp, Fa) This course provides a framework of knowledge, values, skills and experiences for spiritually-sensitive social work practice. It prepares students to respond competently and ethically to diverse spiritual and religious perspectives by using a comparative, critically reflective approach to content. Prerequisite: SCWK 3103 or SCWK 5003 or SCWK 5013.

SCWK5343 Advanced Practice with Groups (Sp, Su) This course provides advanced knowledge, skills, and values needed to assess and intervene effectively with populations seen in the social work practice of group therapy. This course examines group dynamics, life-course and strengths perspectives, and client-centered assessment of needs and their application in agency settings. Prerequisite: SCWK 5003 or SCWK 5013.

SCWK5412 Foundation Field Seminar (Sp) A required course for MSW students without an accredited undergraduate degree in social work. The purpose of the seminar is to allow students to integrate classroom content with experiences in the field, to learn peer supervision and consultation, and to learn from the experiences of other students in the field. Corequisite: SCWK 5434.

SCWK5434 Foundation Field Internship (Sp) This course is required of all graduate students entering the MSW program without an accredited undergraduate degree in social work. Minimum of 330 clock hours of agency-based professional social work practicum experience, supervised by a licensed MSW, is required. Corequisite: SCWK 5412. Prerequisite: SCWK 5003, SCWK 4333, SCWK 4073, SCWK 4093, and SCWK 4153.

SCWK5442 Field Seminar III (Su) This seminar is required of all graduate students entering the MSW program with advanced standing. Students integrate classroom content with experiences in the field, learn peer supervision and consultation, and learn from the experience of other students in the field. Corequisite: SCWK 5444. Prerequisite: admission to graduate program with advanced standing.

SCWK5444 Field Internship III (Su) This course is required of all graduate students entering the MSW program with advanced standing. A minimum of 240 clock hours of agency-based professional social work practicum experience, supervised by a licensed MSW, is required. Corequisite: SCWK 5442. Prerequisite: admission to graduate program with advanced standing.

SCWK6000L Thesis Laboratory (Sp, Su) This laboratory is required for completion of the thesis, which is developed through components of the graduate Research & Technology sequence. Other courses in the graduate curriculum provide support for the conceptualization and development of the thesis. This laboratory is taken in conjunction with SCWK 5073 and SCWK 6073. Corequisite: SCWK 5073 and SCWK 6073.

SCWK6003 Life Course Multi-System Social Work I (Fa) In this first course of a two-semester sequence, students select a community problem, provide services to clients, and address the problem through policy analysis. A review of literature regarding theory and practice, paradigm analysis, development of a practice model, and implementation of micro and mezzo interventions in the field are examined. Corequisite: SCWK 6444, SCWK 6442, and SCWK 5073. Prerequisite: completion of year one for two-year students, or summer semester for advanced standing students.

SCWK6013 Life Course Multi-System Social Work II (Sp) In this second of a two-course sequence students provide services to social work clients. This course covers application of life course theory and multi-system and diversity perspectives. Issues across the life course are considered in addressing interventions through program development, a grant proposal submission, and implementation of macro interventions. Corequisite: SCWK 6073, SCWK 6454, and SCWK 6452. Prerequisite: SCWK 6003.

SCWK6073 Social Work Research and Technology III (Sp) In this final research course, students collect and analyze data as planned in the thesis proposal submitted for Research and Technology II. Course content focuses on the advanced research skills necessary to complete the thesis. Students write a research report of their findings and submit it for publication. Corequisite: SCWK 6013 and SCWK 6000L. Prerequisite: SCWK 5073.

SCWK6442 Advanced Field Seminar I (Fa) The first of two advanced field seminars required of all students in the MSW program. The purpose of the seminar is to allow students to integrate classroom content with experiences in the field, to practice peer supervision and consultation, and to learn from the experiences of other students in the field. Corequisite: SCWK 6444. Prerequisite: SCWK 5412 or SCWK 5442.

SCWK6444 Advanced Field Internship I (Fa) This is the first of two advanced field internships required of all graduate students in the MSW program. A minimum of 330 clock hours of agency-based professional social work practicum experience, supervised by a licensed MSW, is required. Corequisite: SCWK 6442. Prerequisite: SCWK 5434 or SCWK 5444.

SCWK6452 Advanced Field Seminar II (Sp) This is the second of two advanced field seminars required of all students in the MSW program. The purpose of the seminar is to allow students to integrate classroom content with experiences in the field, to demonstrate peer supervision and consultation, and to learn from the experiences of other students in the field. Corequisite: SCWK 6454. Prerequisite: SCWK 6442.

SCWK6454 Advanced Field Internship II (Sp) This is the second of two advanced Field Internship courses required of all graduate students in the MSW program. A minimum of 330 clock hours of agency-based professional social work practicum experience supervised by a licensed MSW is required. Corequisite: SCWK 6452. Prerequisite: SCWK 6442.

SOCIOLOGY AND CRIMINAL JUSTICE, DEPARTMENT OF (SOCI)

William A. Schwab
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- University Professor Morgan,
- Professors Fitzpatrick, Schwab, Smith, Zajicek
- Associate Professors Adams, Holyfield, Koski, Patnoe, Worden
- Assistant Professors Bradley, Myrstol, Yang
- Visiting Assistant Professor Hunt
- Lecturer Newman

Degree Conferred:

M.A. in Sociology (SOCI)

Areas of Concentration: General sociology and rural sociology.

Primary Areas of Faculty Research: Collective behavior and social movements; community studies; criminal justice; family and policy; human ecology; qualitative methods; quantitative methods; race/class/gender inequality; rural sociology; social network analysis; sociology of culture; sociology of emotions; sociology of religion; symbolic interaction; urban sociology.

Prerequisites to Degree Program: Prior undergraduate work in social theory, research methods, statistics, and writing is considered necessary for successful performance at the graduate level. SOCI 3303 (or an approved equivalent), SOCI 3313, SOCI 4023 (or an approved equivalent), and SOCI 5053 (for students without a B.A. in sociology) are required to eliminate deficiencies. Undergraduate deficiencies must be removed by taking the appropriate undergraduate courses during the first twelve hours of graduate work or the first time the courses are offered.

Requirements for the Master of Arts Degree: (Minimum 31 hours.)

Core requirements:
SOCI 5253 Classical Social Theory
SOCI 5263 Contemporary Social Theory
SOCI 5311L Applied Data Analysis Lab
SOCI 5313 Applied Data Analysis
SOCI 5013 Advanced Social Research, or
RSOC 5463 Research Methodology in Social Science
(for those enrolled in the rural sociology concentration)
SOCI 5083 Methods of Field Research

Additional requirements for students enrolled in the Rural Sociology concentration:
RSOC 4623 Introduction to Community Development
RSOC 500V Special Problems

In addition to these core courses, the student must take sufficient hours of electives to reach 31 semester hours total. A maximum of three elective credit hours may be taken at the 4000 level without prior approval by the Graduate Committee. Students may apply three hours of independent study toward the degree provided that a research proposal is approved by the instructor prior to enrollment in the course. Except for courses in Rural Sociology, the student's adviser must authorize courses outside of the department. Except for rare circumstances, no more than three hours of credit outside of the department will count for the degree.

The Department of Sociology and Criminal Justice offers a thesis and non-thesis option. Completion of the program for all students is contingent upon passing a comprehensive examination covering major course work.

Thesis Option: Students must take 25 hours of course work and six hours of thesis credit. All M.A. candidates in this option are required to develop and present a prospectus of the thesis to their thesis committee. They must also write and orally defend their thesis, including research methods, theory, and the area of thesis concentration.

Non-Thesis Option: Students must take 31 hours of course work. Students must select an area of concentration as listed in the departmental graduate handbook. Under this option, students must take a written comprehensive examination in theory, research methods, and the area of concentration.

RURAL SOCIOLOGY (RSOC)

See page 120 for Rural Sociology courses.

Sociology (SOCI)

SOCI4003 Internship in Sociology (Sp, Su, Fa) (Formerly SOCI 4006) Supervised experience in municipal, county, or state agencies, or any other agency which is approved by the instructor. Prerequisite: SOCI 2013.

SOCI401V Special Topics in Sociology (Sp) (1-6) Designed to cover specialized topics not usually presented indepth in regular courses. Prerequisite: SOCI 2013. May be repeated for 6 hours.

SOCI4023 Social Theory (Fa) Nineteenth and 20th century sociological theory. Present-day currents in sociology are studied and related to political, philosophical, and psychological contemporary thought. Prerequisite: SOCI 2013 and junior standing.

SOCI403V Individual Study in Sociology (Sp, Su, Fa) (1-3) A reading and conference course on special topics in sociology for advanced students.

SOCI4043 Seminar in Sociology (Sp) Prerequisite: senior standing.

SOCI4063 Organizations in Society (Fa) An introduction to the study of organizations; provides a broad overview of issues and problems related to organizations in society. Prerequisite: SOCI 2013

SOCI4073 Peoples of East Africa (Fa) The major institutional structures, dynamics and problems of the Africans, Asians, and Europeans of contemporary Uganda, Kenya, Tanzania, Somalia, Sudan, and Ethiopia. Prerequisite: SOCI 2013.

SOCI4123 Black Ghetto (Sp, Fa) The origin, continuity, problems, and personalities, of the Black American community and its contributions to national and international life. Prerequisite: SOCI 2013. (Same as SOCI 4123I)

SOCI4133 The Family (Sp) A sociological analysis of the interactions and relationships which constitute the family as a group and as an institution, to include issues of gender and family diversity. Prerequisite: SOCI 2013 or SOCI 2033.

SOCI4163 Extremism (Sp) Descriptions of, explanations for, religious cults and extremist political groups in America, including question(s) of appropriate response to them. Prerequisite: junior standing.

SOCI4213 Seminar in Violence (Irregular) Explanations for, consequences of, and possible responses to individual, collective, and institutional violence; comparisons between socially acceptable and unacceptable forms of violence. Prerequisite: junior standing.

SOCI4603 Environmental Sociology (Sp) The course provides a social perspective on environmental issues. It examines the linkage between society, ecological systems and the physical environment. It provides conceptual framework(s) for analyzing environmental issues, considers the role of humans in environmental issues, and enhances understanding the complexity of the relationship between societal organization and environmental change. (Same as RSOC 4603)

SOCI500V Advanced Problems in Sociology (Sp, Su, Fa) (1-6) Individual research on problems or problem areas. Prerequisite: graduate standing.

SOCI5013 Advanced Social Research (Fa) Supervised field experience and other projects in social research. Prerequisite: SOCI 2013 and SOCI 3301L and SOCI 3303 and SOCI 3313.

SOCI5023 Sociology of Education (Irregular) Sociological theory and research relevant to education, the school as a social system, professionalization and career patterns of teachers, value conflicts, social stratification, role relationships, and other factors. Prerequisite: graduate standing.

SOCI503V Special Topics (Irregular) (1-6) Designed to cover specialized topics not usually presented in depth in regular courses. May be repeated for 6 hours. Prerequisite: Graduate Standing. May be repeated for 6 hours.

SOCI5053 Advanced General Sociology (Irregular) Advanced survey of the discipline and profession of sociology, including designation of the subject matter of sociology and relation to other disciplines, models of society and people, social units and social processes, methods, and sociology as a profession. Prerequisite: graduate standing.

SOCI5073 The Sociology of Law (Irregular) Sociological analysis of the role of law in American society, the creation of law, and the effects of law. Prerequisite: graduate standing.

SOCI5083 Methods of Field Research (Sp) An introduction to research strategies including intensive interviewing, participant observational fieldwork, content analysis, historical analysis, and comparative research. Emphasis on the practical aspects of designing and executive research involving multiple methods of data gathering and analysis. Prerequisite: graduate standing.
SOCI5113 Seminar in Social Inequality (Fa) Major theories of stratification; types of stratification systems, comparisons of modern and traditional systems; emergent trends. Prerequisite: SOCI 4023 or SOCI 5053.
SOCI5133 The Community (Even years, Sp) A sociological analysis of the theory, methods and materials used in the study of the community. Prerequisite: graduate standing.
SOCI5153 Sociological Perspective on Social Psychology (Sp) Principles, concepts and methods used in analyzing effects of social structures and processes on the self and interaction. Topics include exchange theory, role analysis, symbolic interactionism, social construction of reality, socialization, interpersonal competence, organizational and leadership development, social dislocation, and stress. Prerequisite: graduate standing.
SOCI5213 Social Evaluation (Irregular) Examination of the process of social evaluation at the federal, state and local level, including topics in evaluation strategies, designs, problems encountered in field, and utilization of evaluation results, with special attention to the relationship between process and product evaluation in programs for families and young children. Prerequisite: SOCI 5013.
SOCI5233 Theories of Deviance (Even years, Fa) A survey of major theories-classical, developmental, ecological, functionalist, conflict, subcultural, control, and phenomenological-explaining morally condemned differences in society. Particular emphasis is on practical implications of each perspective for policy and social control. Prerequisite: graduate standing.
SOCI5253 Classical Social Theory (Fa) A survey of social theory up to the late 20th century. An introduction to the classical sociological themes that continue to inform research, analysis, and policy formation. Major issues will include the relationship between the individual and the community, and the sources of stability, conflict, and change. Prerequisite: graduate standing.
SOCI5263 Contemporary Social Theory (Sp) Analysis of contemporary social theories & major theoretical debates. Emphasis is on critical evaluation & application of theoretical perspectives to current social issues affecting families and communities. Prerequisite: SOCI 5253.
SOCI5311L Applied Data Analysis Laboratory (Sp) Provides instruction for data transformations required for the advanced statistical procedures used in the Statistical Package for the Social Sciences (SPSS). Also provides instruction in the use of advanced statistical procedures covered in SOCI 5313. Corequisite: SOCI 5313. Prerequisite: SOCI 3303 and SOCI 3301L.
SOCI5313 Applied Data Analysis (Sp) Covers basic concepts and applications of the general linear model to a variety of sociological research issues and problems. Also provides an introduction to binary dependent and multivariate categorical data analysis for sociological research. Prerequisite: SOCI 3303 or an equivalent course in statistics. Familiarity with statistical computer programs is assumed.
SOCI5403 Survey Methods (Irregular) Introduction to techniques of social survey research. Focuses on the development of survey research instruments and their construction. Measurement techniques are examined including issues of reliability and validity, scaling, and index construction. Elementary sampling considerations are discussed in the applied context of research. Techniques of file generation and manipulation relative to survey research are examined. Prerequisite: SOCI 3303 or equivalent.
SOCI5503 Research Internship (Sp, Fa) Supervised research experience in field setting. Prerequisite: graduate standing.
SOCI600V Master's Thesis (Sp, Su, Fa) (1-6)
SOCI6043 Public Policy, Children and Families (Irregular) The study of the impact of public policy on children and families, and the ways in which policies are created, modified, and changed. Includes the history of public policy concerning children and families.

SPACE AND PLANETARY SCIENCES (SPAC)

Derek Sears
Director
Arkansas Center for Space and Planetary Sciences
MUSE 202
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Web: http://www.uark.edu/csaps

Biological Sciences Faculty:
- Associate Professor Kral
- Assistant Professor Zeigler

Chemistry/Biochemistry Faculty:
- University Professor Sears
- Professor Davis

Chemical Engineering Faculty:
- Professor Ulrich

Geosciences Faculty:
- Professors Cleaveland, Dixon, Jansma

Mechanical Engineering Faculty:
- Associate Professor Roe

Physics Faculty:
- Professor Lacy
- Visiting Assistant Professors Kennefick (D.), Kennefick (J.)

Degree Conferred:

M.S., Ph.D. (SPAC)
Note: Concentrations in Space and Planetary Sciences are also offered in the M.A. degree in Geography, M.S. degree in Geology, Ph.D. degree in Biology, and Ph.D. degree in Physics.

Primary Areas of Faculty Research: Astronomical processes, geological processes on planetary surfaces, planetary atmospheres, mission instrumentation and design, Mars: near-surface processes and biological investigations, surface processes and asteroid sample return.

Areas of Concentration: Planetary astronomy, planetary atmospheres, planetary geology, orbital mechanics and astronautics, and origin and evolution of life,

Admission to Degree Program: The advanced degree programs in space and planetary sciences are based on an undergraduate baccalaureate program developed in accordance with the standards prevailing in one of the academic departments of science or engineering. Students wishing to apply for admission to the graduate degrees in space and planetary science should send a space center application form and a Graduate School application form to the Director of the Arkansas Center for Space and Planetary Sciences. Applicants should also arrange to have transcripts and two letters of recommendation from persons familiar with applicant's previous academic or professional performance sent to the Center. GRE's including the GRE writing are encouraged.

Basic Requirements for both degrees: The program provides advanced coursework and research experience for persons seeking a career in the academic, government, private or military sector of space and planetary sciences. Appropriate programs of advanced courses, examinations, and research are required for all advanced degree candidates. Students are required to take all courses in the general area and core area courses dependent on their area of concentration and electives.

General courses (all required):
- SPAC 5111L Space and Planetary Sciences Laboratory
- SPAC 5123 Internship in Space and Planetary Sciences
- SPAC 5142 Workshop in Communications
- SPAC 5132 Workshop in Ethics
- SPAC 5152 Workshop in Entrepreneurship
- SPAC 500V Graduate research
- SPAC 5161 SPAC Seminars
- SPAC 600V (MS) or 700V (PhD) Masters' or Doctoral dissertation

Core areas
Planetary Astronomy:
- Core course
  - SPAC 5213/ASTR 5033 Planetary Systems
- Electives
  - ASTR 4013 Astrophysics
  - GEOL 4433 Geophysics
  - CHEM 5263 Nuclear Chemistry
  - CHEM 5273 Cosmochemistry

Planetary Geology:
- Core course
  - SPAC 5413/GEOL 5413 Planetary Geology
- Electives
  - GEOL 5063 Geochemistry
  - GEOL 4413 Principles of Remote Sensing

GEOL 5123 Stratigraphic Principles and Practice
GEOL 5423 Remote Sensing of Natural Resources

Planetary Atmospheres:
Core course
SPAC 5313/GEOG 5313 Planetary Atmospheres
Electives
GEOG 4353 Elements of Weather
GEOG 4363 Climatology
GEOG 4043 Applied Climatology
GEOG/ENDY 5113 Global Change
ENDY 5063 Paleoclimatology
GEOL/ENDY 5533 Marine Geology

Origin and Evolution of Life:
Core course
SPAC 5513/CHEM 5513/BIOL 5513 Chemical and Biochemical Evolution
Electives
BIOL 4353 Ecological Genetics
BIOL 5463 Physiological Ecology of Animals
MBIO 4233 Microbial Genetics
MBIO 4303 Physiology Of Microorganisms
CHEM 5813 Biochemistry I

Orbital Mechanics and Astronautics:
Core course
MAE 5923/SPAC 5613 Guidance and Control of Aerospace Vehicles
Electives
MEEG 4433 Propulsion
MEEG 5273 Electronic Packaging
MEEG 5323 Space-Based Design and Manufacturing

NOTE: Every student must register for a minimum of one credit hour of SPAC 600V or 700V in each term during which the student is present and doing thesis or dissertation research. The number of 4000-level courses allowed in a program is limited to two. Masters' students will be required to take 3 of the 5 area core courses, doctoral students must take 4 of the 5 core courses. In addition, a minimum of 3 electives must be chosen from those listed in the core areas.

Additional Requirements for Master of Science Degree: A thesis reporting original research will generally be required for all candidates for the Master of Science degree in space and planetary sciences. In certain rare cases, with the approval of the graduate faculty of the center, six hours of SPAC 500V may be substituted for a thesis. A detailed written report of the work in SPAC 500V must be prepared and successfully defended before the candidate's M.S. committee. The work will involve an extensive review of the space and planetary sciences literature on a topic approved by the student's committee and must demonstrate an ability to make integrative interpretations of this multidisciplinary subject and of a similar quality to that appearing in a professional journals.

Additional Requirements for the Doctor of Philosophy Degree: There are no defined course requirements or number of hours required of all students beyond those described above or required by the graduate school and the student's committee. A doctoral advisory committee is appointed to evaluate the candidate's preparation and to draw up a suitable program of study and research, which may require additional coursework to remedy deficiencies in the student's preparation. This committee consists of the student's major professor and at least two other members of the space and planetary science faculty, to be drawn from at least three different academic departments in the university. Under most circumstances, the major professor will serve as the chair of the committee. Students are required to complete a dissertation describing original research work in the space and planetary sciences that must be presented to and successfully defended before their committee.

The candidacy examination is administered by the student's committee and is designed to test the student's ability to assimilate, integrate and interpret material learned in the core required courses (SPAC 5213/ASTR 5033, SPAC 5313/GEOG 5313, SPAC 5413/GEOL 5413, SPAC 5513/CHEM 5513/BIOL 5513, and SPAC 5613) while at the same time having a depth of understanding in the area of the student's research. Thus the candidacy examination will be in two parts: (1) a 2500-word integrative essay on a theme chosen by the committee, and (2) a specialist question in the student's area (planetary astronomy, planetary geology, planetary atmospheres, origin and evolution of life and orbital mechanics and astronautics) that must be defended before the committee. Both parts (1) and (2) will be assigned six weeks before the candidacy defense and shall be presented to the committee two weeks before the defense. The defense will be held at a date determined by the committee but usually before the end of the student's second year in graduate school.

Space and Planetary Sciences (SPAC)

SPAC500V Graduate Research (Irregular) (1-10) This course covers research performed by students in the graduate programs in space and planetary sciences: the MS and PhD in space and planetary sciences, and concentrations in space and planetary sciences for the PhD degrees in physics, biology, and mechanical engineering and the master's degrees in geology and geography.

SPAC5033 Planetary Systems (Odd Years, Fa) The nature of the solar system and other planetary systems as deduced from observations and theoretical modelling. Structure and evolution of terrestrial and jovian planets and their satellites. Planetary atmospheres, magnetospheres, and the solar wind; planetary interiors. Theoretical and observed properties of exoplanetary systems; astrobiology.

SPAC5111L Space and Planetary Lab (Irregular) Laboratory course in space and planetary sciences consisting of experiments in the five major areas of space and planetary sciences: planetary astronomy, planetary geology, planetary atmospheres, origin and evolution of life and orbital mechanics and astronautics. Intended for students enrolled in the graduate programs in space and planetary sciences.

SPAC5123 Internship (Irregular) Internship for graduate students in the space and planetary sciences graduate degree programs and concentrations in the graduate programs in physics, biology, geosciences and mechanical engineering. Students conduct a phase of their research, normally for one month, at a national or industrial laboratory in North America or overseas.

SPAC5132 Ethics Workshop (Irregular) A two-week workshop exploring the ethical issues of conducting research in the space and planetary sciences. Through a study of case histories, the course will explore both issues of academic and research honesty, such as the fabrication of data, and the ethics surrounding the execution of research, such as issues surrounding planetary protection. Summer only.

SPAC5142 Communications Workshop (Irregular) A two-week workshop concerning the ways in which scientists communicate the results of their work to the general public. The course is taught by prominent journalists in the space and planetary sciences and puts an emphasis on original writing and critique. The workshop is not considered satisfactorily completed until each student has an article published in a university or higher-circulation publication. Summer only.

SPAC5152 Enterpreneurship Workshop in Space and Planetary Sciences (Irregular) A two-week workshop addressing the ways in which technology generated during scientific and engineering research is transferred to the private sector and used for wealth generation. Summer only.

SPAC5161 Seminar (Irregular) Seminars organized by the Arkansas-Oklahoma Center for Space and Planetary Sciences covering topics on the cutting edge of research in the field for graduate students conducting research with a faculty member in the space and planetary sciences as part of their graduate degree programs or concentrations in the graduate programs in physics, biology, geology, geography and mechanical engineering.

SPAC5313 Planetary Atmospheres (IR) Origins of planetary atmospheres, structures of atmospheres, climate evolution, dynamics of atmospheres, levels in the atmosphere, the upper atmosphere, escape of atmospheres, and comparative planetology of atmospheres. (Same as CHEG 5313)

SPAC5413 Planetary Geology (Irregular) Exploration of the solar system, geology and stratigraphy, meteorite impacts, planetary surfaces, planetary crusts, basaltic volcanism, planetary interiors, chemical composition of the planets, origin and evolution of the Moon and planets.

SPAC5513 Biochemical Evolution (Irregular) Abiotic synthesis of biomolecules on Earth, the origin of cells; genetic information, origin of life on Earth and elsewhere, evolution and diversity, ecological niches, bacteria, archaea, and eukaryotic, novel metabolic reshaping of the environment, life being reshaped by the environment, molecular data, and evolution. Prerequisite: CHEM 5813.

SPAC5553 Astrobiology (irregular) Discusses the scientific basis for the possible existence of extraterrestrial life. Includes origin and evolution of life on Earth, possibility of life elsewhere in the solar system (including Mars), and the possibility of life on planets around other stars. Prerequisite: Instructor Consent.

SPAC600V Master's Thesis (Irregular) (1-10)

SPAC700V Doctoral Dissertation (Irregular) (1-10)

SPANISH

See Foreign Languages, page 107.

SPECIAL EDUCATION (SPED)

Tom Smith
Head, Department of Curriculum and Instruction
214 Peabody Hall
479-575-4209

Web: http://www.uark.edu/depts/coehp/CIED.htm/

- Professor Gartin
- Associate Professor Imbeau
- Assistant Professor Collins
- Instructor Jordan

Degrees Conferred:

M.Ed. (SPED)

The M.Ed. in special education is designed for those students seeking a degree in special education.

Admission to the M.Ed. program in special education is based on the general requirements of the Graduate School.

Requirements for the Master of Education Degree: (Minimum 36 hours.) All programs will require nine semester hours of core courses, three semester hours of cognate study, and 24 semester hours in special education.

This course work is selected by students and faculty according to the needs of the student and licensure requirements.

All programs require the completion of a minimum of 36 semester hours of work for the degree. Core course requirements can be satisfied by taking three hours from each of the areas listed below:

1. EDFD 5013 Research Methods in Education
   EDFD 5393 Statistics in Education and Health Professions
2. EDFD 5373 Psych. Foundations of Teaching and Learning
   EDFD 5473 Adolescent Psychology in Education
   EDFD 5573 Life-Span Human Development
3. EDFD 5303 Historical Foundations of Modern Education
   EDFD 5323 Global Education
   EDFD 5353 Philosophy of Education
   EDFD 5683 Issues in Educational Policy

Special Education (SPED)

SPED5103 Nature and Needs of the Moderately and Severely Retarded (Sp, Su, Fa) Educational, psychological, and social characteristics of children with moderate and severe mental retardation. Prerequisite: CIED 3023.
SPED560V Workshop (Sp, Su, Fa) (1-18) May be repeated for 18 hours.
SPED599V Seminar (Irregular) (1-18) May be repeated for 18 hours.
SPED600V Master's Thesis (Irregular) (1-6)
SPED605V Independent Study (Sp, Su, Fa) (1-18)
SPED699V Doctoral Seminar (Sp, Su, Fa) (1-18)
SPED700V Doctoral Dissertation (Sp, Su, Fa) (1-6) Prerequisite: candidacy.

STATISTICS (STAT)

Allan Cochran
Chair, Department of Mathematical Studies
305 Science Engineering Building
479-575-3351

Laurie Meaux
Chair of the Division of Statistics and Graduate Coordinator
309A Science Engineering Building
479-575-3351
E-mail: lmeaux@uark.edu

Web: http://comp.uark.edu/~vdo/Statweb/

- Professors Gbur, McNew
- Associate Professors Mauromoustakos, Meaux, Petris
- Assistant Professor De Oliveira
- Research Associate Duncan, Thompson

Degree Conferred:

M.S. (STAT)

The Master of Science degree program in statistics is intended to provide training for a professional career, principally in applied statistics. Toward this end, students with degrees other than in mathematics, as well as mathematics majors, are encouraged to apply for admission. Requirements for this degree may be satisfied by completing the Statistics, Biometry, or Educational Statistics concentration. A suggested outline of course work may be obtained by contacting the Chair of Studies.

Requirements for the Master of Science Degree:

Statistics Concentration: A candidate must complete a minimum of 30 hours of graduate credits that must include the following: STAT 4001L and STAT 4003 or STAT 4033, STAT 4373, STAT 5103, STAT 5113, STAT 5313, STAT 5333, STAT 5343, STAT 5353, STAT 5383 and STAT 610V (3), in addition to MATH 4363. CSCE 1023/1021L, MATH 3083, and MATH 4513 or MATH 3423 (or their equivalent) are prerequisites and otherwise will be considered as deficiencies.

Biometry Concentration: A candidate must complete a minimum of 36 graduate credits that must include the following: STAT 4001L (or AGST 4011), STAT 4003 (or AGST 4023), STAT 4373 (or AGST 5014), STAT 5103, STAT 5113, STAT 5313, STAT 5333, and STAT 5353, and AGST 5803, AGST 5901, and AGST 5913. MATH 2574 and MATH 3083, or their equivalents, are prerequisites and otherwise will be considered as deficiencies.

Educational Statistics Concentration: A candidate must complete a minimum of 30 graduate credits that must include the following: STAT 4001L and STAT 4003 (or EDFD 6403), STAT 4373 (or EDFD 6413), STAT 5103, STAT 5113, STAT 5313, STAT 5333, and STAT 5353, EDFD 6653, and 6 hours of EDFD 699V. MATH 2574 and MATH 3083, or their equivalents, are prerequisites and otherwise will be considered as deficiencies.

For the requirements for the Ph.D. in Mathematics with an emphasis in Statistics, see the Ph.D. in Mathematics program description.

Statistics (STAT)

STAT4001L Statistics Methods Laboratory (Sp, Fa) Emphasis on use of integrated statistical packages to complement statistical methodology being covered concurrently in STAT 4003. Corequisite: STAT 4003.
STAT4003 Statistical Methods (Sp, Fa) Concepts of probability, sampling, regression, and experimental design. Corequisite: STAT 4001L. Prerequisite: MATH 2554.
STAT4033 Nonparametric Statistical Methods (Sp, Su, Fa) Chi square tests. Kolmogorov-Smirnov goodness-of-fit tests, the Mann-Whitney and Wilcoxon 2-sampling tests, and various nonparametric measures of association. Prerequisite: MATH 1203 and junior standing.
STAT4043 Sampling Techniques (Sp, Su, Fa) Considers optimum techniques of simple random, stratified random, cluster, systematic and multistage sampling from finite populations subject to cost precision constraints. Wide range of application. Prerequisite: STAT 4003.
STAT4373 Experimental Design (Sp) Topics in the design and analysis of planned experiments, including randomized block, Latin square, split plot, and BIB designs, use of fractional factorial replication, and repeated measures. Prerequisite: STAT 4003.
STAT5103 Theory of Statistics (Fa) Fundamentals of probability, distribution theory, and random variables; expected value, moments, and generating functions; classic parametric families of distributions; central limit theorems, inequalities, and laws of large numbers. Prerequisite: MATH 2574.
STAT5113 Statistical Inference (Sp) Statistical theory of estimation and testing

hypothesis. Prerequisite: STAT 5103.
STAT5313 Regression Analysis I (Sp) Matrix formulation of least squares and multiple regression models. Estimability and use of the generalized inverse in analysis of variance and covariance models of less than full rank. Computational aspects are emphasized.
STAT5322 Statistical Packages (Sp, Fa) Emphasis on use of digital computer to perform statistical data analysis through the use of integrated statistical packages. Instruction includes use of the SAS, SPSS, and BMD packages. Data management operations as well as formal statistical procedures such as ANOVA and regression are considered. Prerequisite: 3 hours of statistics.
STAT5333 Analysis of Categorical Responses (Sp) A modern treatment, including extensions of classical probit analysis, multivariate logistic models, GSK model, loglinear models in analysis of multiway contingency tables, and nonmetric multidimensional scaling. Prerequisite: STAT 5313.
STAT5343 Stochastic Processes (Sp, Su, Fa) Markov chains, branching processes, birth-death processes, queuing theory with application. Prerequisite: STAT 5103.
STAT5353 Methods of Multivariate Analysis II (Sp) Hotelling's T2 procedures, multivariate analysis of variance, discriminant function analysis and problems of classification, multidimensional scaling, and cluster analysis. Prerequisite: STAT 5313.
STAT5383 Time Series Analysis (Sp, Su, Fa) Identification, estimation and forecasting of time series. Spectral analysis including the fast Fourier transform computational aspects are emphasized. Prerequisite: STAT 5103.
STAT5413 Spatial Statistics (Fa) Applied spatial statistics, covering univariate spatial modeling (kriging), multivariate spatial modeling (cokriging), methods of estimation and inference, and spatial sampling designs. Special relevance to remote sensing. Prerequisite: STAT 5313.
STAT610V Research in Statistics (Irregular) (1-4) Prerequisite: graduate standing.
STAT639V Topics in Statistics (Irregular) (1-3) Current state of the art on methodology in one of the topics: multivariate analysis, time series analysis, sequential analysis, factor analysis, or biostatistics.

TELECOMMUNICATIONS ENGINEERING

See Electrical Engineering.

TRANSLATION (TRAN)

John T. DuVal
Chair of Studies
333 Kimpel Hall
479-575-4301

Web: http://www.uark.edu/depts/english/PCWT/trans.htm/

See English and Foreign Language faculty lists.

Degree Conferred:

M.F.A. (TRAN)

Requirements for M.F.A. in Translation: Candidate must demonstrate a satisfactory knowledge of two foreign languages. The candidate must take a minimum of 60 graduate hours. A candidate who already holds a graduate degree may be able to complete the program with 42 hours; a candidate who does not have at least a minor in English may be required to take additional courses.

The following courses are required:	HOURS
Translation and Workshop	15
Form and Theory of Translation, or	
Intro. to Comparative Literature	3
Fiction Writing Workshop	3
Form and Theory of Fiction	3
Poetry Writing Workshop	3
Form and Theory of Poetry	3

Twenty-four hours chosen from the literature of foreign languages, including at least 6 hours from each of the candidate's source languages. Teaching assistants may substitute ENGL 5003 Composition Pedagogy or FLAN 5063 Teaching Foreign Languages at the College Level for literature courses in a foreign language. Candidates without previous history of English or Latin courses must substitute ENGL 6193 or LATN 3063.

There will also be a thesis consisting of a translated collection of poems and/or stories or a translated novel, epic, or drama, as well as comprehensive written and oral examinations. A student must register for a minimum of six hours of M.F.A. thesis.

All degree requirements must be completed within six consecutive calendar years from the date of first enrollment.

Other Requirements: The policies and procedures approved for the Master of Arts and the Master of Science degrees also apply to the Master of Fine Arts degree. In addition to completing other requirements, the candidate must pass a comprehensive examination administered by the respective program area.

Through an agreement with the Academic Common Market, residents of certain Southern states may qualify for graduate enrollment in translation as in-state students for fee purposes. See page 237 for details.

TRANSPORTATION AND LOGISTICS MANAGEMENT

See Marketing and Logistics in the Graduate School of Business, page 190.

TRANSPORTATION ENGINEERING (TREG)

Kevin D. Hall
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Web: http://www.engr.uark.edu
- University Professor Elliott
- Professors Dennis, Gattis, Hall, Wang
- Research Professor Buffington
- Associate Professors Cassady, Nachtmann, Rossetti
- Research Assistant Professors Tooley, Williams

Degree Conferred:

M.S.T.E. (TREG)

The Master of Science in Transportation Engineering program is accredited by the Engineering Accreditation Commission of ABET. The program is designed to prepare graduates for careers with governmental transportation and planning agencies, transportation engineering consulting firms, and industrial transportation groups. The program is broad-based, built upon courses offered in the Departments of Civil Engineering, Industrial Engineering, and Marketing and Logistics. Students can focus their studies in one of four areas: transportation planning, facility design and construction, system operation, or industry logistics and operations.

Program Objective: The objective of the program is to develop transportation engineers with diverse backgrounds and perspectives who are prepared for careers with governmental agencies, engineering firms, or transportation providers. To this end, both engineering graduates and graduates of non-engineering programs are accepted into the M.S.T.E. program. The non-engineering graduates are required to complete a series of basic engineering courses to prepare them for graduate-level engineering studies and to assure that they are adequately prepared for entry-level positions in the transportation engineering field.

Areas of Concentration: Transportation planning, facility design and construction, system operation, or industry logistics and operations.

Primary Areas of Faculty Research: Facility design; highway geometrics; traffic operations and safety; pavement design and rehabilitation; asphalt concrete mixture design; construction materials characterization; construction quality control; transportation management systems; high-speed pavement condition data acquisition; transportation and land development; ITS; planning; logistics; operations management; optimization.

Prerequisites to Degree Program: In addition to the general

Graduate School requirements, applicants must meet the following specific requirements to be accepted into the M.S.T.E. program.

Applicants Possessing an ABET Engineering Degree: Applicants possessing a degree from a program accredited by the Engineering Accreditation Commissions of the Accreditation Board for Engineering and Technology (ABET) may be accepted unconditionally without prerequisite undergraduate course requirements. However, the student's major adviser and graduate study committee may identify areas of weakness that will require remedial study.

Applicants NOT Possessing an ABET Engineering Degree: Applicants not possessing a degree accredited by the Engineering Accreditation Commissions of ABET will be accepted into the program on the condition that they satisfactorily complete or demonstrate satisfactory completion of the following prerequisites:

Mathematics and Basic Science (Minimum 32 hours.)
- At least 15 hours of mathematics beyond trigonometry, including differential and integral calculus and differential equations.
- General chemistry and calculus-based physics with a two-semester sequence in at least one.

Humanities and Social Studies (Minimum 15 hours.)

Engineering Topics (48 hours minimum)
- Complete at least 48 hours of undergraduate-level engineering topics. The engineering topics taken to satisfy this requirement must be consistent with and appropriate to the major emphasis of the student's field of study and include appropriate engineering design experiences.

Specific topics that must be completed include the following:

	HOURS
Statics	3
Mechanics of Materials	3
Engineering Economics	2
Engineering Computer Applications	3
Basic Transportation Engineering	3

Other specific engineering topics may be required depending on the graduate study emphasis and courses that will be taken.

As a culmination to satisfying the 48-hour engineering topics prerequisites (generally within the final 12 to 15 hours of study) or as a part of the graduate studies, one course must concentrate on a major design project that results in the production of a design report or other design product as appropriate. The design project must build on and require engineering knowledge and skills from previous course work and must incorporate engineering standards and realistic constraints. The following courses may be taken to satisfy this requirement:

Area of Concentration

Transportation Planning: CVEG 4841 with CVEG 4433
Facility Design and Construction: CVEG 4841 with CVEG 4433
Transportation System Operation: CVEG 4841 with CVEG 4433
Transportation Industry Logistics and Operations: INEG 4904

Other courses may be approved by the student's graduate study committee and the Chair of Transportation Engineering Studies. To receive such approval, evidence must be presented clearly demonstrating that the course includes a major design project that meets all of the requirements described above.

Credit for prerequisite courses taken at another institution is subject to the approval of the Chair of Transportation Engineering Studies. In particular, advanced (3000- and 4000-level at the University of Arkansas) engineering courses will normally not be accepted from institutions or degree programs that are not accredited by the Engineering Accreditation Commission of ABET.

Requirements for the Master of Science in Transportation Engineering Degree: In addition to the requirements of the Graduate School and the graduate faculty in engineering, candidates for the M.S.T.E. degree must complete a course of study as prescribed below and as approved by the student graduate study committee. They must also demonstrate, to the satisfaction of their graduate study committee, that they possess those abilities and characteristics required of graduates from ABET accredited engineering programs. In consultation with the graduate study committee, the student may select either the thesis option or the non-thesis option.

Thesis Option: (30 hours) Twenty-four hours of graduate-level coursework, including:

12 hours of transportation engineering topics
3 hours of an approved course from Marketing and Logistics
3 hours of an approved course in statistics or quality management
6 hours of thesis research

Non-Thesis Option: (33 hours). Thirty hours of graduate-level coursework, including:

15 hours of transportation engineering topics
3 hours of an approved course from Marketing and Logistics
3 hours of an approved course in statistics or quality management
3 hours of independent study resulting in a written Master's Report.

The following is a listing of courses that are acceptable transportation engineering topics for the M.S.T.E. degree (course descriptions are listed under Civil Engineering and Industrial Engineering):

CVEG 4003 CAD and Visualization for Civil Structures
CVEG 4403 Public Transportation
CVEG 4413 Pavement Evaluation and Rehabilitation
CVEG 4423 Geometric Design
CVEG 4433 Transportation Pavements and Materials
CVEG 5143 Transportation Soils Engineering
CVEG 5343 Highway Bridges
CVEG 5413 Transportation and Land Development
CVEG 5423 Structural Design of Pavement Systems
CVEG 5433 Traffic Engineering
CVEG 5443 Transportation Planning Methods
CVEG 5453 Asphalt Mix Design and Construction
CVEG 5463 Transportation Network Modeling
CVEG 5473 Transportation Systems Characteristics
CVEG 5483 Transportation Management Systems
CVEG 5493 Infrastructure Management with GIS and DB
INEG 4333 Industrial Statistics
INEG 5333 Design of Industrial Experiments
INEG 5613 Optimization Theory I
INEG 5673 Graphs and Network Theory
INEG 5823 Systems Simulation

Graduates must present a cumulative grade-point average of no less than 3.00 on all graduate courses and a cumulative grade-point average of no less than 2.70 on all courses that are prerequisites to acceptance into the program. They also must pass a final examination administered and graded by the candidate's major adviser and graduate study committee. The examination is to be comprehensive and will include either a defense of the candidate's thesis or a presentation and discussion of the candidate's Master's Report. The examination may be oral, written, or a combination of both.

VOCATIONAL EDUCATION (VOED)

Barbara E. Hinton
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Web: http://www.uark.edu/depts/coehp/VAED.htm/

- Professors Biggs, Daugherty, Hinton, Thompson (C.)
- Associate Professors De Vore, Nafukho, Orr, Thompson (D.)
- Assistant Professors Banks, Beck, Brooks, Mungania

Degrees Conferred:

M.A.T. (VOED)
M.Ed. in Workforce Development Education (WDED) (See Adult Education)
Ed.D. (VOED)

The Master of Arts in Teaching (M.A.T.) is a degree program of 33 semester hours. The M.A.T. degree is the vocational teacher education program for students at the University of Arkansas.

Areas of Concentration for the M.A.T.: Agricultural education, childhood education, middle-level education, physical education, secondary education, and vocational education.

Prerequisites to the M.A.T. Degree Program: Students will be selected up to the maximum number designated for each cohort area of emphasis.

Requirements for admission to the M.A.T. degree program for initial certification:

1. Completion of an appropriate undergraduate degree program
2. Cumulative GPA of 2.70 in all courses completed prior to receipt of a bachelor's degree program
3. Admission to the Graduate School
4. Admission to Teacher Education Program
5. Completion of the pre-education core with a minimum of "C" in all courses
6. Completion of all prerequisite courses in teaching field
7. Payment of internship fee

Requirements for the Master of Arts in Teaching Degree: minimum 33 hours.

Required M.A.T. Core: 10 hours
- CIED 5012 Measurement/Research/Statistical Concepts for Teachers
- CIED 5022 Classroom Management Concepts for Teachers
- CIED 5042 Reading and Writing across the Curriculum
- CIED 5052 Seminar: Multicultural Issues
- ETEC 5062 Teaching and Learning with Computer-Based Technologies

Remaining Required for Concentration in Vocational Education: 23 hours
- VOED 5004 Cohort Directed Field Experience
- VOED 5016 Cohort Teaching Internship
- VOED 5103 Teaching Strategies in Vocational Education
- VOED 5113 Laboratory Management in Vocational Education
- VOED 5191 Applied Research
- VOED 599V Seminar (3 hours)

Doctoral Studies: The program has proposed a reconfigured doctorate in Workforce Development Education to replace the Ed.D. in Adult Education and the Ed.D. in Vocational Education. Please see our Web site at http://www.uark.edu/depts/coehp/ VAED.htm/ for our progress on this proposal.

Vocational Education (VOED)

VOED5004 Cohort Directed Field Experience (Sp, Su, Fa) A minimum of 8 weeks will be spent in an off-campus school, at which time the student will have an opportunity to observe 6 classroom teachers and to teach under supervision. Prerequisite: cohort year status.
VOED5016 Cohort Teaching Internship (Sp, Su, Fa) A minimum of 10 weeks will be spent in an off-campus school, at which time the intern will have an opportunity under supervision to observe, to teach, and to participate in other activities involving the school and the community. Prerequisite: cohort year status.
VOED5103 Teaching Strategies in Vocational Education Methods and techniques in teaching vocational business, home economics, and industrial technology education.
VOED5113 Laboratory Management in Vocational Education Selection, design, and evaluation of laboratory experiences in vocational business, home economics, and industrial technology education.
VOED5123 Current Design and Evaluation in Vocational Education (Sp, Su, Fa) Methods and techniques in developing, organizing, implementing, and evaluating programs in vocational education.
VOED5191 Applied Research (Sp, Su, Fa) Interpretation and evaluation of research in education for classroom utilization.
VOED5233 Cooperative Education/Apprenticeship (Sp, Su, Fa) Planning, organizing, and directing cooperative and apprenticeship programs in vocational education.
VOED5303 Trends and Issues in Business and Marketing Education (Sp, Su, Fa) Advances the student's knowledge of issues and concerns in planning for teaching in business and marketing education. Considers history, current trends, issues, program contents, and problems in business and marketing education.
VOED560V Workshop (Irregular) (1-18) May be repeated for 18 hours.
VOED574V Internship (Irregular) (1-18)
VOED5803 Contemporary Issues in Vocational Education (Sp, Su, Fa) A study of issues, problems, and challenges pertaining to the goals, objectives, organization, and curriculum of the vocational education program.
VOED600V Master's Thesis (Irregular) (1-6)
VOED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

Vocational and Adult Education (VAED)

VAED605V Independent Study (Irregular) (1-18)
VAED6113 Administrative Leadership for Vocational and Adult Education (Sp, Su, Fa) The function of administering vocational and adult education programming is addressed through the study of leadership style, function, and constituency.
VAED6133 Instructional Management in Vocational and Adult Education (Sp, Su, Fa) An analysis of designing and managing vocational and adult instructional programs with competency developing in directing curriculum development, improving instruction, formulating schedules, and installing competency-based education.
VAED6143 Student Services in Vocational and Adult Education (Sp, Su, Fa) A comprehensive course which includes managing student recruitment and admissions, providing systematic counseling and guidance services, maintaining overall school discipline, establishing a student placement service, and coordinating follow-up studies.
VAED6213 Curriculum Development in Vocational and Adult Education (Sp, Su, Fa) Determining principles of curriculum development, organizing curricula, and evaluating curriculum materials with special reference to vocational and adult education.
VAED6303 Program Planning and Evaluation in Vocational and Adult Education (Sp, Su, Fa) Emphasis is given to understanding the theoretical foundation upon which the programming process is predicated, developing a theoretical mode, and acquiring the conceptual tools necessary for analyzing the programming process in any vocational or adult education organization.
VAED6403 Special Topics in Human Resource Development (Sp, Su, Fa) Designed for persons interested in exploring topics specific to vocational and adult education and human resource development in business and industry settings. Emphasis given to examining vocational and adult education research as applied in the public and private sector.
VAED6443 Program Evaluation in Human Resource Development (Even years, Sp) This course is a doctoral level course designed as an introduction to program evaluation in human resource development, training, and other HRD interventions. Emphasis is on (a) systems thinking applied to evaluation, (b) organizational development and program improvement, and (c) the integration of evaluation with strategic planning and performance improvement.
VAED6453 Training in the Workplace (Sp, Su, Fa) An introduction to and survey of current theories and practices in training in the workplace. Students are expected to explore selected interdisciplinary topics in areas such as adult education, vocational education, human resource development, organizational behavior, instructional technology, and economics as they relate to training in the workplace.
VAED674V Internship (Irregular) (1-18) Prerequisite: advanced graduate standing.
VAED680V Educational Specialist Project (Irregular) (1-6) An original project, research paper, or report required of all Ed.S. degree candidates. Prerequisite: admission into E.D.S. program.
VAED692V Directed Field Experience (Irregular) (1-18) Teaching and supervision in secondary or post-secondary schools or work in business or industry under guidance. For students who desire or need directed experience.
VAED699V Seminar (Irregular) (1-18) May be repeated for 18 hours.

WORKFORCE DEVELOPMENT EDUCATION

See Adult Education, page 46 and Vocational Education, page 169.

The Graduate School of Business

OBJECTIVES

The Graduate School of Business has as its objective the advancement and dissemination of knowledge in the business and organizational disciplines through scholarly research and excellence in its graduate management education programs.

ADMISSION

Anyone who wishes to earn graduate-level credit, whether as a degree-seeking student or as a non-degree seeking student, must make formal application and be officially admitted by the Graduate School of Business. The Graduate School of Business offers two classifications of admission: Degree Standing and Non-Degree Standing.

1. **DEGREE STANDING**
   The Graduate School of Business shall admit only those applicants to Degree Standing whose enrollment the Graduate School of Business considers will contribute positively to the quality of life and educational programs of the Graduate School of Business. Unlike the Graduate School, students are simultaneously admitted to the Graduate School of Business and a degree program.
2. **NON-DEGREE STANDING**
   The Graduate School of Business will admit applicants to single semester Non-Degree Standing whose enrollment will not lead to a degree.

Application. Applications for admission to the Graduate School of Business must be accompanied by a $40 application fee ($50 for international applicants), which is not refundable and will not apply against the general registration fee if the applicant enrolls. Applicants will not be considered for admission until all required application materials have been received by the Graduate School of Business.

Applicants who are seeking a graduate degree must submit the following items:

1. Application form
2. Application fee ($40 domestic; $50 international)
3. Current resume
4. Three letters of recommendation
5. Official transcripts from each college or university attended
6. Two one-page essays
7. Official GMAT score (M.B.A., M.Acc., M.I.S., and M.T.L.M.)
8. Official GRE score (M.A.Econ.)
9. Official TOEFL or IELTS score (international applicants only)
10. Financial and Supplemental Information form (international applicants only)
11. Educational Summary form (International applicants only)
12. TSE (International applicants to M.I.S. program or to Ph.D. programs).

The application form may be obtained on the Web at http://gsb.uark.edu/, or the application packet may be obtained from and should be submitted directly to the following address:

GRADUATE SCHOOL OF BUSINESS
475 Business Building
University of Arkansas
Fayetteville, AR 72701

Telephone: 479-575-2851
Fax: 479-575-8721
E-mail: gsb@walton.uark.edu

Transcripts. For applicants who desire Degree Standing: It is the responsibility of each applicant who desires full graduate standing to request of each college or university at which the student has previously attended that it send directly to the Graduate School of Business one official copy of the student's academic record including all courses, grades, and credits attempted and indication of degree(s) earned.

Note: The fact that courses completed at one institution may be included on a transcript from another institution will not suffice; official transcripts must be received from each institution previously attended. All transcripts become the property of the Graduate School of Business and will not be released to the applicant or to any other person, institution or agency. All application materials, including all official transcripts, should be received by the Graduate School of Business by the published application deadline for the program for which the student is applying.

Previously Enrolled or Currently Enrolled at University of Arkansas, Fayetteville. For those previously enrolled or currently enrolled at the University of Arkansas, Fayetteville, the Graduate School of Business obtains transcripts from the Registrar's Office. For a graduate of the University of Arkansas, Fayetteville (baccalaureate degree), the only transcripts are those from the University of Arkansas, Fayetteville, and those from each institution attended after completing the University of Arkansas, Fayetteville, degree. Anyone who was previously enrolled, but who is not currently enrolled in the University of Arkansas Graduate School of Business, is considered a "readmission" and is required only to submit an Application for Admission (no fee) and official transcripts from institutions attended after the University of Arkansas Graduate School of Business enrollment. (See Classification of Admission: Readmission below.)

Deferred Admission. Admission to the Graduate School of Business is for a specific semester only. Applicants who wish to change their date of entry after submitting an application must notify the Graduate School of Business Office. Applicants who have already been admitted but who would like to change their date

of entry must request to have their admission deferred. Admission may be deferred for up to one academic year at the discretion of the Director of the masters program to which the student has been admitted. Application materials for applicants who apply for admission, but who do not subsequently enroll, will be retained by the Graduate School of Business Office for two calendar years from the date of the applicant's original proposed semester of entry. However, applicants must file a new Application for Admission (no fee) to notify the Graduate School of Business of their request for reconsideration. Applicants who are admitted but who do not enroll for two years or more after admission must resubmit the entire application packet and follow procedures for initial admission.

Admission to Degree Standing. Official notice of the decision concerning admission will be sent from the Graduate School of Business for admission to the Master of Business Administration, Master of Accountancy, Master of Arts in Economics, Master of Information Systems, and the Master of Transportation and Logistics Management programs.

Adviser. At the time of admission to a degree program in the Graduate School of Business, the student is assigned to a major adviser who acts as the adviser throughout the student's program of study. The appointment of the adviser is made in the student's major department.

International and Resident Alien Applicants. International applicants and resident aliens must submit a minimum score of 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 213 on the computer-based version of the TOEFL or a minimum score of 6.5 on the IELTS taken within the preceding two years, unless their native language is English, they have received a graduate degree from an accredited U.S. graduate school, or they have demonstrated an acceptable level of language proficiency as defined in the Graduate School Handbook located on the Graduate School Web site. Applicants to the Master of Information Systems degree must submit official scores for the Test of Spoken English (TSE). International applicants and resident alien applicants may refer to page 19 of this catalog for additional information related to their application.

Additional Language Requirement for Doctoral Students. Doctoral students are normally called upon to teach an undergraduate course at some point during their program. The University of Arkansas and the Walton College of Business are committed to providing quality instruction at the undergraduate level. As a result, all doctoral students whose native language is not English are required to take the Test of Spoken English (TSE) and present a minimum score of 50. The TSE must be taken prior to admission or no later than the end of the first semester of the student's matriculation at the University of Arkansas. In no case will a doctoral student be allowed to teach an undergraduate course without meeting the minimum score requirement on the TSE.

Classifications of Admission

The Graduate School of Business admits students as either degree-seeking or as non-degree-seeking for a single semester. Degree-seeking students are simultaneously admitted to the Graduate School of Business and to the degree program in which they are seeking a degree. Each master's degree program in the Walton College has its own minimum admissions criteria. Meeting the minimum criteria listed below does not imply that admission will be granted. The minimum requirements for admission to the Graduate School of Business and master's degree programs leading to a graduate degree are as follows:

Degree-Seeking/Regular Standing.

1. A grade-point average of 2.70 or better (A = 4.00) on all course work taken prior to receipt of a baccalaureate degree from a regionally accredited institution of higher education and an acceptable GMAT or GRE score.
2. A grade-point average of 3.20 or better on the last 60 hours of course work taken prior to the receipt of a baccalaureate degree from a regionally accredited institution of higher education and an acceptable GMAT or GRE score.

Degree-Seeking/Conditional Standing.

3. A grade-point average between 2.50 and 2.69 on all course work taken prior to receipt of a baccalaureate degree from a regionally accredited institution of higher education, acceptable GMAT or GRE score, and approval of the Associate Dean for Academic Affairs, on condition that the student makes a cumulative grade-point average of 3.00 or better on the first 12 hours of graduate-level course work in the degree program and meets any other conditions that may be specified by the faculty of the department or program.

Any other consideration for regular admission must be by individual petition to the Associate Dean for Academic Affairs and, where pertinent, a recommendation from the appropriate departmental chair will be considered on its own merits, case by case.

Non-Degree Seeking, Single Semester. Applicants who desire non-degree standing must complete the Non-Degree Seeking Application and must sign the STATEMENT OF UNDERSTANDING portion of the form. Students admitted to a single semester non-degree standing must understand that any enrollment taken in this classification will not normally carry degree credit. Transcripts are not required for applicants seeking this single semester non-degree standing.

Persons who are admitted as non-degree seeking and who subsequently decide to pursue a degree must apply for and be admitted into a master's degree program by the appropriate admissions committee of the Graduate School of Business.

A non-degree seeking student may take no more than six semester hours of graduate-level courses that can be counted toward the requirements for a graduate degree. At the time of acceptance into a degree program, the director of the appropriate master's degree program will recommend to the Graduate School of Business which courses previously taken, if any, are to be accepted in the degree program.

Letter of Good Standing. A graduate student who is in good standing at another regionally accredited institution in the United States may be given admission (non-degree status) to the Graduate School of Business for one semester upon submission of an Application for Admission and a letter of good standing from the dean of the Graduate School at that institution. If at some time in the future the student should wish to pursue a degree in the Graduate School of Business or in the University of Arkansas Graduate School, it will be necessary to follow the normal procedures for admission and to have official transcripts sent from each institution previously attended. Graduate courses transferred and used for requirements for a degree at another university cannot be used for a graduate degree at this institution.

Readmission. Readmission to the Graduate School of Business is not automatic.

1. A student who has not been enrolled during the preceding semester (fall or spring), and who has not attended any other institution of higher education during his or her absence must submit to the Graduate School of Business a Readmission Form.
2. A student who has not been enrolled during the previous semester (fall or spring) and who has attended any other institution of higher education during that semester must submit a new application form (no fee) to the Graduate School of Business along with an official transcript from the institution attended.
3. A student who has not been enrolled for more than one semester, whether or not he/she has attended another institution of higher education, must submit a new application for admission (no fee). At the time of readmission, the appropriate admissions

committee will determine whether to readmit the student and which classes taken during previous enrollments at the Graduate School of Business will be counted toward graduation.

Transfer of Credit. The Graduate School of Business will allow transfer of credit of a maximum of six credit hours under the following circumstances:

1. the hours were earned at an AACSB-accredited school, and
2. the student earned an "A" or "B" in the courses requested for transfer credit, and
3. the master's program coordinator approves the courses for credit toward a master's degree.

REGISTRATION AND RELATED TOPICS

Important information regarding registration for classes, withdrawal, attendance, and related issues can be found on page 23. The Graduate School of Business adheres to the guidelines as set forth in the Graduate Catalog with the exception of full-time status noted below.

Full-Time Status. Enrollment in 9 semester hours (not including audited courses) is considered full-time for graduate students unless otherwise specified by individual degree programs. For full-time enrollment in the summer, consult the Graduate School Handbook, available on the Graduate School Web site, http://www.uark.edu/depts/gradinfo/.

GRADES AND MARKS

The Graduate School of Business uses the same grading and marking system as the Graduate School. For additional information regarding grades and marks, please see page 23.

ACADEMIC DISMISSAL

Students may be dropped from further study in the Graduate School of Business if, at any time, their performance is considered unsatisfactory as determined by either the program faculty or the Associate Dean for Academic Affairs of the Walton College of Business. Academic or research dishonesty or failure to maintain a specified cumulative grade-point average are considered to be unsatisfactory performance. The Graduate School of Business subscribes to and enforces the academic honesty policy of the University of Arkansas (see page 32).

For students enrolled in the Master of Arts in Economics degree program, the following academic standards apply: If a student has less than a 2.85 cumulative grade-point average on 12 or more semester hours of graded course work taken in residence for graduate credit, the student will be placed on academic probation. The student will subsequently be dismissed from the Graduate School of Business if the cumulative GPA is not raised to 2.85 or above on the next nine hours of graded graduate course work.

For students enrolled in the Master of Accountancy, Master of Business Administration, Master of Information Systems, or Master of Transportation and Logistics Management degree programs, the following academic standards apply: Whenever a student has less than a 3.00 cumulative grade-point average on graded course work taken in residence for graduate credit, the student will be placed on academic probation and warned of the possibility of academic dismissal. If the student fails to bring his/her cumulative grade-point average up to or above a 3.00 at the conclusion of the next grading period, he/she will be academically dismissed from the program. Any student who earns more than two "C" grades in graduate courses taken to fulfill requirements for the master's degree will be academically dismissed.

Using its own written procedures, the graduate faculty of each master's degree program may recommend that the student be readmitted to the Graduate School of Business. The graduate faculty of the master's degree programs may establish, and state in writing, the requirements for continuation in that program. Non-degree seeking students who are dismissed may petition for readmission to the Graduate School of Business by submitting a written appeal to the Associate Dean for Academic Affairs.

A cumulative grade-point average of 3.00 is required to be eligible for graduation. In addition, at least 75 percent of the graduate credit hours submitted for a degree must be "A" or "B" grades. Students in the Master of Accountancy, Master of Information Systems, or Master of Transportation and Logistics Management may have no more than two "C" grades in graduate courses taken for the degree. Students may take up to an additional six credit-hours of graduate coursework in an effort to raise the cumulative grade-point average to 3.00. Students who repeat a course to raise their grade must count the repetition toward the maximum of six additional hours. All requirements for a master's degree must be completed within six calendar years.

ACADEMIC HONESTY POLICY

Scope, Implementation and Review

The procedures contained in this policy pertain to graduate students under the authority of the Graduate School of Business. Where policies contained herein conflict with those described for undergraduate students in the *Student Handbook*, the policies contained in this policy shall take precedence for graduate students.

For details of procedures for implementing this policy, contact the Office of Community Standards and Student Ethics or the Graduate School of Business.

Academic Honesty

The University of Arkansas and the Graduate School of Business present this policy as part of their effort to maintain the integrity of academic processes. Academic honesty should be a concern of the entire university community, and a commitment to it must involve students, faculty, staff, and administrators.

Students must understand what academic integrity is and what the most common violations are. With that understanding they must commit themselves to the highest standards for their own, as well as for their peers', academic behavior.

Public support and encouragement by the faculty is a second critical component necessary to strengthen academic integrity on campus. Faculty members must be continually vigilant in the management of their classes, their assignments, and their tests.

Finally, the administration of the University must present to the students standards of academic integrity. Those standards must be part of a publicly recognized, understood, and accepted set of policies and procedures that can be applied consistently and fairly in cases of academic dishonesty.

It is the responsibility of each student, faculty member, and administrator to understand these policies. A lack of understanding is not an adequate defense against a charge of academic dishonesty.

With regard to the application of this policy, the University assures its support of faculty members and other employees of the University who are acting in good faith in the course and scope of their employment and in the performance of their official duties.

This policy is only a part of the University's effort to promote academic and research integrity in all aspects of its programs. By necessity, this policy discusses only prohibited acts and a process of applying sanctions. The ultimate goal, of course, is to provide an atmosphere that will make superfluous the procedures and sanctions that follow.

Definitions

Academic dishonesty involves acts that may subvert or compromise the integrity of the educational or research process at the

University of Arkansas. Included is an act by which a student gains or attempts to gain an academic advantage for himself or herself or another by misrepresenting his or her or another's work or by interfering with the completion, submission, or evaluation of work. Academic misconduct may include those acts defined as research or scholarly misconduct. Allegations of research or scholarly misconduct on the part of graduate students are subject to this policy. However, such cases may also be reviewed under the University's Research and Scholarly Misconduct Policies and Procedures.

Academic and/or research misconduct may include, but is not limited to accomplishing or attempting any of the following acts:

- Altering grades or official records.
- Using any materials that are not authorized by the instructor for use during an examination.
- Copying from or viewing another student's work during an examination.
- Collaborating during an examination with any other person by giving or receiving information without specific permission of the instructor.
- Stealing, buying, or otherwise obtaining information about an examination not yet administered.
- Collaborating on laboratory work, take-home examinations, homework, or other assigned work when instructed to work independently.
- Substituting for another person or permitting any other person to substitute for oneself to take an examination.
- Submitting as one's own any theme, report, term paper, essay, computer program, other written work, speech, painting, drawing, sculpture, or other art work prepared totally or in part by another.
- Submitting, without specific permission of the instructor, work that has been previously offered for credit in another course.
- Plagiarizing, that is, the offering as one's own work the words, ideas, or arguments of another person or using the work of another without appropriate attribution by quotation, reference, or footnote. Plagiarism occurs both when the words of another are reproduced without acknowledgement or when the ideas or arguments of another are paraphrased in such a way as to lead the reader to believe that they originated with the writer. It is not sufficient to provide a citation if the words of another have been reproduced – this also requires quotation marks. It is the responsibility of all University students to understand the methods of proper attribution and to apply those principles in all materials submitted.
- Sabotaging of another student's work.
- Falsifying or committing forgery on any University form or document.
- Submitting altered or falsified data as experimental data from laboratory projects, survey research, or other field research.
- Committing any willful act of dishonesty that interferes with the operation of the academic or research process.
- Facilitating or aiding in any act of academic or research dishonesty.

Procedures

Sanctions for acts of academic dishonesty committed by masters students in the Graduate School of Business may be applied in the following ways.

Initial Report of Infraction

1. Infractions Involving Graded Course Work

When an instructor determines or believes that a student in the instructor's class is responsible for academic dishonesty deserving of sanction, the instructor will meet with the student and explain the allegation. Without waiving the option to pursue charges, the instructor may also choose to contact the Office of Student Mediation and Conflict Resolution for help in resolving the situation. If the instructor wishes to pursue charges of academic misconduct, he/she should within five working days after meeting with the student, or as soon as practicable thereafter, follow a. or b., below. If the Office of Student Mediation and Conflict Resolution is involved, the five days does not begin until the instructor is aware of the termination of those services. (If the instructor is either a graduate teaching assistant or a temporary faculty member, then a supervising faculty member or the departmental head or chairperson may assist in the handling of an academic dishonesty case.)

a. The instructor may determine a grade sanction and within five working days report that sanction along with the essential details of the matter to the judicial coordinator in the Office of Community Standards and Student Ethics and to the Dean of the Walton College or his designee. The student sanctioned in this way by an instructor will be notified by the Office of Community Standards and Student Ethics and will have five working days from that notification to request a hearing by the All University Judiciary (AUJ). The All University Judiciary is defined, and its composition described, in the *Student Handbook*. If the student does not request a hearing within five working days, then it is assumed that the sanction is not contested. The student will be required to have a conference with the judicial coordinator so that the consequences of the action can be made clear. The student may appeal a grade sanction to the AUJ only on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate School of Business Students.

To the extent practical, at the discretion of the instructor, during the course of an appeal to the AUJ or the Graduate Grievance committee (depending on the nature of the appeal), the student's participation in the affected class should continue so that any action can be reversed without prejudicing the student's academic performance and evaluation.

The AUJ is given the authority to determine whether the evidence substantiates the charges of the instructor. If the AUJ determines that the evidence does not substantiate the charges, the grade sanction will be withdrawn and the matter will end. Should the AUJ determine the evidence does substantiate the charges of the instructor, the grade sanction will stand and the AUJ may also impose additional sanctions, as listed under Sanctions, below. The degree program and/or the Graduate School of Business may impose sanctions in addition to those imposed by the instructor and the AUJ, including expulsion from the program or the University. While the instructor should be consulted in such cases, these additional sanctions may be imposed by the AUJ, the Graduate School of Business and/or the degree program without the permission of the instructor. In addition to other sanctions, graduate students may be dismissed by their degree program or the Graduate School of Business on the first or any subsequent instances of academic dishonesty. Students may not withdraw from either courses in which judicial action is pending or in which they have received a grade sanction.

b. The instructor may file an incident report form referring the case to the student judicial process for determinations of responsibility and the application of sanctions. If the student is determined to be responsible for academic dishonesty, then the instructor may apply a grade sanction in addition to whatever sanctions are applied by the judicial process. To the extent practical, at the discretion of the instructor, while such a case

is pending in the judicial process, the student's participation in the affected class should continue, to avoid pre-empting the options available after responsibility is determined.

If the student is determined to be responsible for the actions charged, the instructor will impose a grade sanction. The AUJ has no authority to impose a grade sanction, but is permitted to make a recommendation and to impose other sanctions, as described below. Additionally, the Graduate School of Business and/or the degree program may impose sanctions in addition to those imposed by the instructor. In such cases, the instructor should be consulted, but additional sanctions may be imposed by the AUJ, the Graduate School of Business and/or the degree program without the permission of the instructor. Students may not withdraw from a course for which judicial action is pending or in which they have received a grade sanction. Should the graduate student feel that the severity of the grade sanction is unfair, he/she may appeal via the Academic Grievance Policy for Graduate School of Business Students.

It should be noted that, in addition to other possible sanctions, graduate students may be dismissed by their degree program and/or the Graduate School of Business on the first or any subsequent instance of academic dishonesty.

2. Infractions Not Involving Graded Course Work

Cases of academic misconduct may occur in situations not involving graded course work. One example is a situation where a graduate student plagiarizes material for his/her dissertation. In cases not involving graded course work, the department chairperson/program director and major professor, or other appropriate official(s) will meet with the student. Without waiving the option to pursue charges, the program may also choose to contact the Office of Student Mediation and Conflict Resolution for help in resolving the situation. If the department/ program decides to proceed with charges of academic misconduct, the chair/head/director or other appropriate official will, within five working days after meeting with the student (If the Office of Student Mediation and Conflict Resolution is involved, the five days do not begin until the instructor is aware of the termination of those services.), or as soon as practicable thereafter, follow one of the following:

a. The department or program faculty will determine a sanction and the department chairperson/program director will, within five working days after meeting with the student [or as soon as practicable thereafter], report that sanction along with the essential details of the incident to the judicial coordinator in the Office of Community Standards and Student Ethics, and to the Dean of the Walton College or his designee. The student sanctioned in this way by a department or program will be notified by the Office of Community Standards and Student Ethics and will have five working days from that notification to request a hearing by the All University Judiciary (AUJ). The All University Judiciary is defined, and its composition described, in the *Student Handbook*. If the student does not request a hearing within five working days, then it is assumed that the sanction is not contested. The student will be required to have a conference with the judicial coordinator so that the consequences of the action can be made clear.

The student may appeal such a sanction to the AUJ only on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate School of Business Students.

While such a case is pending in the student judicial process, to the extent practical, at the discretion of the program, the student's participation in the degree program should continue so that any action can be reversed without prejudicing the student's academic performance and evaluation.

b. The department chairperson/program director may file an incident report form referring the case to the judicial process for determination of responsibility. If the student is determined to be responsible for academic dishonesty, then the judicial board may impose a sanction in addition to that imposed by the program/department and the Graduate School of Business. Sanctions are listed and described below. To the extent practical, at the discretion of the program, while such a case is pending in the judicial process, the student's participation in the program should continue, to avoid pre-empting the options available after the responsibility is determined.

Unlike the situation in which the Judicial Board hears the appeal of a student protesting a sanction imposed by the department/program, students who are sanctioned by the Judicial Board itself may appeal both the imposition of and the severity of the sanction via the Academic Grievance Procedure for Graduate School of Business Students. Graduate students may be dismissed by their degree program and/or the Graduate School of Business on the first or any subsequent instance of academic dishonesty.

Appeals

1. When a sanction has been imposed by the instructor or department/program: The student may appeal such a sanction to the AUJ on the grounds that he/she did not commit the violation. If the student wishes to appeal the severity of a sanction, he/she will follow the Academic Grievance Procedures for Graduate School of Business Students. In both cases, the student will notify the appropriate office of his/her appeal within five working days of receiving the sanction, or as soon as practicable. For appeals to the AUJ, the student will contact the Office of Student Ethics and Community Standards. For appeals following the Academic Grievance Procedures for Graduate School of Business Students, the student will contact the Graduate School of Business.
2. When a sanction has been imposed by the AUJ: Unlike the situation in which the Judicial Board hears the appeal of a student protesting a sanction imposed by the department/program, students who are sanctioned by the Judicial Board itself may appeal either or both the imposition of and the severity of the sanction via the Academic Grievance Procedure for Graduate School of Business Students. Students who wish to initiate such an appeal shall contact the Graduate School of Business within five working days of receiving the sanction, or as soon as practicable.
3. When a sanction has been imposed by the Graduate School of Business: Students who are sanctioned by the Graduate School of Business may appeal to the Dean of the Graduate School.

Sanctions

The choice of sanctions in cases of academic dishonesty involves considerations of the integrity of the educational process of the University. There is no place in that process for academic dishonesty; and these actions will be taken seriously. The intent of this policy is to make acts of academic dishonesty clear risks, that is, the sanctions are to be sufficiently heavy to deter academic dishonesty.

While not intended to be an exhaustive list, the following are possible sanctions for academic dishonesty:

- Grade Sanctions: An instructor may impose a grade sanction. Grade sanctions may consist of either grades of zero or failing grades on part or all of a submitted assignment or examination, or a lowering of a course grade, or a failing course grade. All grade sanctions must be appropriately reported as outlined in the

procedures above. A graduate student may appeal the severity of a grade sanction via the Academic Grievance Procedures for Graduate School of Business Students. Once a grade sanction has been applied, following the procedures outlined herein, students may not withdraw from courses in which they have been assessed a grade sanction, unless this has been recommended by the AUJ or a grievance committee.

- Other Sanctions: The graduate student's program or the Graduate School of Business may impose a variety of other sanctions, including but not limited to any of the following: requiring an activity designed to increase the student's awareness of and understanding about academic honesty, placing the student on probation or suspension, or dismissing the student.
- The AUJ may administer the following sanctions: university reprimand, university censure, conduct probation, restrictive conduct probation, suspension, indefinite suspension, educational sanctions, or expulsion. Please see the *Student Handbook* for definitions of these sanctions.

It should be noted that graduate students may receive any of these sanctions, including dismissal, upon the first or any subsequent finding of academic misconduct.

ANNUAL NOTICE OF STUDENT RIGHTS UNDER THE FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

The Graduate School of Business adheres to the Family Educational Rights and Privacy Act (FERPA) which affords students certain rights with respect to their education records, described on page 34.

ANNUAL GRADUATE STUDENT ACADEMIC REVIEW

The Graduate School of Business implements the Graduate Council policy that any student whose program lasts more than three semesters will be reviewed annually by his/her degree program for progress toward the degree. At a minimum, the review will cover progress in the following: a) in completing courses with an adequate grade-point average; b) in completing the thesis/dissertation/project requirements; c) in completing all of the required examinations; d) toward completing other requirements for the degree. When the review of each student is completed, the review form will be signed by the graduate student and the department/program head/chair, as well as other appropriate individuals as designated in the program review policy. This review will be forwarded to the Graduate School, to be included in the student's file.

ADMINISTRATIVE REQUIREMENT FOR GRADUATION

Application for graduation must be completed in the Graduate Dean's office, filed with the Registrar, and fees paid for the semester in which degree requirements will be completed and graduation effected. If a student fails to complete the degree, the student must then renew the application and pay a renewal fee.

RESIDENCY REQUIREMENTS

The Graduate School of Business adheres to the residency requirements established by the Graduate School as described on page 37.

GRADUATE STUDENT GRIEVANCE

The Graduate School of Business of the Sam M. Walton College of Business Administration recognizes that there may be occasions when a graduate student has a grievance about some aspect of his/her academic involvement. It is an objective of the University of Arkansas that a graduate student may have prompt and formal resolution of his/her academic grievances and that this be accomplished according to orderly procedures. Below are the procedures to be used when a graduate student has an academic grievance with a faculty member or administrator. If the student has a grievance against another student or another employee of the University, or if the student has a grievance that is not academic in nature, the appropriate policy may be found by contacting the Office of Affirmative Action or the Office of the Dean.

Definition of Terms

Graduate Student. Under this procedure, a graduate student is any person who has been formally admitted to the Graduate School of Business of the Sam M. Walton College of Business Administration of the University of Arkansas, Fayetteville, and who is/was enrolled as a graduate-level student at the time the alleged grievance occurred. (Note: Students pursuing a Ph.D. in Business Administration or in Economics should follow the grievance policy of the Graduate School.)

Academic Grievance. An academic grievance is a dispute concerning some aspect of academic involvement arising from an administrative or faculty decision which the graduate student claims is unjust or is in violation of his/her rights. Any behavior on the part of a faculty member or administrator, which the student believes to have interfered with his/her academic progress, is subject to a grievance. While a complete enumeration of the student's rights with regard to academic involvement is not possible or desirable, we have provided a short list as illustration. However, as in all cases involving individual rights, whether a specific behavior constitutes a violation of these rights can only be decided in context, following a review by a panel of those given the authority to make such a decision.

In general, the graduate student:

1. has the right to competent instruction;
2. is entitled to have access to the instructor at hours other than class times (office hours);
3. is entitled to know the grading system by which he/she will be judged;
4. has the right to evaluate each course and instructor;
5. has the right to be treated with respect and dignity.

In addition, an academic grievance may include alleged violations of the affirmative action plans of the University related to academic policies and regulations, as well as disputes over grades, graduate assistantship employment agreements, course requirements, graduate/degree program requirements, thesis advisory committee composition, and/or adviser decisions.

Formal Academic Grievance. An academic grievance is considered formal when the student notifies the Dean of the Walton College, in writing, that he/she is proceeding with such a grievance. The implications of this declaration are: 1) all correspondence pertaining to any aspect of the grievance will be in writing and will be made available to the Dean and his/her designee; 2) all documents relevant to the case, including minutes from all relevant meetings, will be part of the complete written record and will be forwarded to the Dean and his/her designee upon receipt by any party to the grievance; 3) the policy contained herein will be strictly followed; and 4) any member of the academic community who does not follow the grievance policy will be subject to disciplinary actions. Filing a formal academic grievance is a serious matter, and the student is strongly encouraged to seek informal resolution of his/her concerns before taking such a step.

Complete Written Record. The "complete written record" refers to all documents submitted as evidence by any party to the

complaint, as subject to applicable privacy considerations. (Note: Because the tape recordings of committee meetings may contain sensitive information, including private information pertaining to other students, the tape or verbatim transcription of the tape will not be part of the complete written record. However, general minutes of the meetings, documenting the action taken by the committees, will be part of the record.)

Working Days. Working days shall refer to Monday through Friday, excluding official University holidays.

Procedures

1. Individuals should attempt to resolve claimed grievances first with the person(s) involved, within the department or program, and wherever possible, without resort to formal grievance procedures. The graduate student should first discuss the matter with the faculty member or administrator involved, with the faculty member's chairperson or degree program coordinator, or with the Walton College Dean or his/her designee. The student's questions may be answered satisfactorily during this discussion. If the grievance is with the departmental chairperson or program coordinator, the student may choose to meet with the Walton College Dean or his/her designee for a possible informal resolution of the matter.
2. If a student chooses to file a formal academic grievance, the following procedures are to be followed. The students in the Master of Business Administration (M.B.A.) program shall take the appeal in written form to the M.B.A. Program Director. Students in the departmentally based masters programs (M.Acc., M.A.Econ., M.I.S., and M.T.L.M.) shall take the written appeal to the appropriate departmental chairperson. The student shall forward a copy of the written appeal to the Walton College Dean or his/her designee. In the case of a grievance against a departmental chairperson, the M.B.A. Program Director or an administrator who does not report directly to a departmental chairperson, the student will go directly to the Walton College Dean or his/her designee. The appropriate person to receive the written appeal will be referred to as the initial appellate authority. In any case, the Walton College Dean or his/her designee must be notified of the grievance. After discussion between the initial appellate authority (i.e. chairperson/M.B.A. Program Director/Dean and his/her designee) and all parties to the grievance, option 2a, 2b, or 3 may be chosen.
   a. All parties involved may agree that the grievance can be resolved by a recommendation of the initial appellate authority. In this case, the initial appellate authority will forward a written recommendation to all parties involved in the grievance within 20 working days after receipt of the written grievance. The initial appellate authority is at liberty to use any appropriate method of investigation, including personal interviews and/or referral to an appropriate departmental or program committee for recommendation.
   b. Alternatively, any party to the grievance may request that the initial appellate authority at once refer the request, together with all statements, documents, and information gathered in his or her investigation, to the applicable reviewing body. For the M.B.A. Program the applicable reviewing body is the M.B.A. Advisory Committee; for other masters programs it is the relevant program advisory committee. The reviewing body shall, within ten working days from the time its chairperson received the request for consideration, present to the initial appellate authority its written recommendations concerning resolution of the grievance. Within ten working days after receiving these recommendations, the initial appellate authority shall provide all parties to the dispute with copies of the reviewing body's recommendation and his or her consequent written decision on the matter.
3. If the grievance is not resolved by the procedure outlined in item 2, or if any party to the grievance chooses not to proceed as suggested in item 2, he/she will appeal directly to the Dean of the Walton College or his designee. Whenever a grievance comes to the attention of the Dean, either as a result of a direct appeal or when a grievance has not been resolved satisfactorily at the departmental/program level, the Dean and his/her designee will consult with the person alleging the grievance. If that person decides to continue the formal grievance procedure, the Dean will notify all parties named in the grievance and the relevant program administrator (i.e. departmental chairperson or the M.B.A. Program Director), that a formal grievance has been filed. Within ten working days, the Dean and his/her designee will:
   a. with the consent of the student, appoint a faculty member as the student's advocate, and
   b. appoint an ad hoc committee of five faculty members and two graduate students, chosen to avoid obvious bias or partiality, to review the grievance and report to him/her. The Walton College Dean or his/her designee will serve as the chair of the grievance committee and will vote only in the case of a tie. A voting member of the Graduate School of Business Masters Program Committee will serve as the non-voting secretary of the committee.

      The committee shall have access to witnesses and records, may take testimony, and may make a record by taping the hearing. Its charge is to develop all pertinent factual information (with the exception that the student and faculty member/administrator will not be required to be present in any meeting together without first agreeing to do so) and, on the basis of this information, to make a recommendation to the Walton College Dean to either support or reject the appeal. The Dean will then make a decision based on the committee's recommendation and all other documents submitted by the parties involved. The Dean's decision, the committee's written recommendation and a copy of its complete written record (excluding those in which other students have a privacy interest) shall be forwarded to the person(s) making the appeal within 20 working days from the date the committee was first convened; copies shall be sent simultaneously to other parties involved in the grievance. The Graduate School of Business, in such a way that the student's privacy is protected, shall retain a copy.
4. Within ten working days of the receipt of the Walton College Dean's decision, any party to the grievance may appeal to the Dean of the University of Arkansas Graduate School as described in step 3 of the procedures of Academic Grievance Procedures for Graduate Students in the Graduate School.
5. When, and only when, the grievance concerns a course grade and the committee's recommendation is that the grade assigned by the instructor should be changed, the following procedure applies. The committee's recommendation that the grade should be changed shall be accompanied by a written explanation of the reasons for that recommendation and by a request that the instructor change the grade. If the instructor declines, he/she shall provide a written explanation for refusing. The committee, after considering the instructor's explanation and upon concluding that it would be unjust to allow the original grade to stand, may then recommend to the department chair that the grade be changed. The department chair will provide the instructor with a copy of the recommendation and ask the instructor to change the grade. If the instructor continues to decline, the department chair may change the grade, notifying the instructor, the Walton College Dean or his/her des-

ignee, and the student of the action. Only the department chair, and only on recommendation of the committee, may change a grade over the objection of the instructor who assigned the original grade. For courses with a specific M.B.A. program designation (MBAD course number prefix) the Walton College Dean or his/her designee shall fulfill the department chair responsibilities described in this section. No appeal or further review is allowed from this action. All grievances concerning course grades must be filed within one calendar year of receiving that grade.

6. The Master of Arts in Economics is the only Graduate School of Business program with a thesis option. When, and only when, a student in that program brings a grievance concerning the composition of his/her thesis committee, the following procedure will apply. The Walton College Dean or his/her designee shall meet with the graduate student and the faculty member named in the grievance, and shall consult the chair of the committee, the department chairperson, and/or the program coordinator for their recommendations. In unusual circumstances, the Dean and his/her designee may remove a faculty member from a student's thesis committee or make an alternative arrangement. With regard to the chair of the thesis committee, this is a mutual agreement between the faculty member and the student to work cooperatively on a research project of shared interest. Either the graduate student or the faculty member may dissolve this relationship by notifying the other party, the departmental chairperson, and the Walton College Dean or his/her designee. However, the student and the adviser should be warned that this may require that all data gathered for the thesis be abandoned and a new research project undertaken with a new faculty advisor.
7. If a grievance, other than those covered by step 5, is not satisfactorily resolved through steps 1 through 4 or 6, an appeal in writing and with all relevant material may be submitted for consideration and a joint decision by the Chancellor of the University of Arkansas, Fayetteville, and the Provost/Vice Chancellor for Academic Affairs. This appeal must be filed within 20 working days of receiving the decision of the Dean of the University of Arkansas Graduate School. Any appeal at this level shall be on the basis of the complete written record only, and will not involve interviews with any party to the grievance. The Chancellor of the University of Arkansas, Fayetteville, and the Provost/Vice Chancellor for Academic Affairs shall make a decision on the matter within 20 working days from the receipt of the appeal. Their decision shall be forwarded in writing to the same persons receiving such a decision in step 4. Their decision is final pursuant to the delegated authority of the Board of Trustees.
8. If any party to the grievance violates this policy, he/she will be subject to disciplinary action. When alleging such a violation, the aggrieved individual shall contact the Walton College Dean in writing, with an explanation of the violation.

GRADUATE ASSISTANT GRIEVANCE POLICY

It is the philosophy of the Graduate School that assistantships are not typical employee positions of the University. This has two implications. First, the sponsor should also serve as a mentor to the student and assist, to the extent possible, in facilitating the student's progress toward his/her degree. Second, any questions concerning performance in or requirements of assistantships shall be directed to the Graduate School or, for master's students in business, to the Graduate School of Business. (Note: the term "graduate assistant" will be used to refer to those on other types of appointments as well, such as fellowships, clerkships, etc.)

The Graduate School has the following authority with regard to graduate assistantships:

1. All requests for new positions, regardless of the source of the funds, must be approved by the Graduate School. When the position is approved, the requesting department or faculty member must complete the form, "Request for a New Graduate Assistant Position" and submit it to the Graduate School. All proposed changes in duties for existing graduate assistantships must be approved by the Graduate School prior to their implementation.
2. The duty requirements of the graduate assistantship, including the number of hours required, must be approved by the Graduate School. Fifty percent graduate assistants may not be asked to work more than 20 hours per week (Note: this is not limited to time actually spent in the classroom or lab; the 20 hour requirement also pertains to time required to grade/compute results, develop class/lab materials, etc. Moreover, students cannot be asked to work an average of 20 hours per week, with 30 hours one week and 10 hours the next, for example. The duty hour requirement is no more than 20 hours per week for a 50 percent appointment. See the *Graduate Handbook*. However, it should also be noted that if the student is engaged in research which will be used in his/her required project, thesis, or dissertation, or if the student is traveling to professional meetings, data sources, etc., the student may work more than 20 hours per week.) The duty requirements must complement the degree program of the graduate student and must abide by the philosophy that the first priority of graduate students is to finish their degrees.
3. The Graduate School, in consultation with the Graduate Council, has the right to set the enrollment requirements for full-time status for graduate assistants.
4. The Graduate School sets the minimum stipend for graduate assistantships, but does not have responsibility for setting the actual stipend. Graduate assistants will be provided with a written statement of the expected duties for their positions, consistent with the duties outlined in the "Request for New Graduate Assistant Position" or any amendments submitted to the Graduate School. A copy of the written statement will be submitted to the Graduate School of Business for inclusion in the student's file. Graduate assistants may be terminated from their positions at any time or dismissed for cause under the procedures of Board Policy No. 405.1. Termination is effected through the giving of a notice, in writing, of that action at least 60 days in advance of the date the employment is to cease. A copy of the notice must be sent to the Dean of the Walton College and to the Dean of the Graduate School.

   A graduate assistant has the right to request a review of the termination by the Dean, following the procedure given below. However, a student should be warned that if the grounds for dismissal are based on any of the following, the only defense to the termination is evidence to show that the charges are not true:
   a. The student fails to meet the expectations of the assistantship positions, as outlined in the initial written statement provided to them at the beginning of the appointment.
   b. The student provides fraudulent documentation for admission to their degree program and/or to their sponsor in applying for the assistantship positions.
   c. The student fails to meet certain expectations which need not be explicitly stated by the sponsor, such as the expectation that i) the student has the requisite English language skills to adequately perform the duties of the position; ii) the student has the appropriate experience and skills to perform the duties of the position; and iii) the student maintains the appropriate ethical standards for the position. The Research Misconduct Policy provides one reference source for such ethical standards.
   d. The student fails to make good progress toward the degree, as determined by the annual graduate student academic review and defined by program and Graduate School policies.

Definition of Terms

Graduate Assistant. Any graduate student holding a position which requires that the student be admitted to a graduate degree program of the University of Arkansas, regardless of the source of funds, and for whom tuition is paid as a result of that position.

Sponsor. The person responsible for the funding and duty expectations for the graduate assistant.

Formal graduate assistant grievance. Any dispute concerning some aspect of the graduate assistantship, as defined above, which arises from an administrative or faculty decision that the graduate student claims is a violation of his or her rights. The formal graduate assistant grievance does not pertain to cases in which there is a dispute between co-workers

Violation of graduate assistant's rights. An action is considered a violation of the graduate assistant's rights if: a) it violates Graduate School policy with regard to graduate assistantships; b) it threatens the integrity of, or otherwise demeans, the graduate student, regardless of any other consideration; c) it illegally discriminates or asks the graduate assistant to discriminate; d) it requires the student to do something which was not communicated as a condition of holding the assistantship (or the underlying expectations outlined above); e) it terminates the student from an assistantship for behaviors which are irrelevant to the holding of the assistantship or were never included as expectations for the assistantship; f) it requires the student to do something which violates University policy, the law, or professional ethics. Note: It is impossible to state all of the conditions which might constitute a violation of graduate assistants' rights or, conversely, which might defend a respondent against charges of such violations. Such complaints require a process of information gathering and discussion that lead to a final resolution of the matter by those who have been given the authority to do so.

Formal grievance. A grievance concerning graduate assistantships/fellowships is considered formal when the student notifies the Dean of the Walton College, in writing, that he/she is proceeding with such a grievance. The implications of this declaration are: a) the student will be provided with an advocate; b) all correspondence pertaining to any aspect of the grievance will be in writing, and will be made available to the Dean; c) all documents relevant to the case, including minutes from all relevant meetings, will be part of the complete written record, and will be forwarded to the Dean upon receipt by any party to the grievance; d) the policy contained herein will be strictly followed; and e) any member of the academic community who does not follow the grievance policy will be subject to disciplinary actions. Filing a formal grievance is a serious matter, and the student is strongly encouraged to seek informal resolution of his/her concerns before taking such a step.

Respondent. The person who is the object of the grievance.

Procedures

Note: Grievances are confidential. Information about the grievance, including the fact that such a grievance has been filed, may never be made public to those who are not immediately involved in the resolution of the case, unless the student has authorized this release of information or has instigated a course of action which requires the respondent to respond. An exception to this confidentiality requirement is that the immediate supervisor or departmental chairperson of the respondent will be notified and will receive a copy of the resolution of the case. Since grievances against a respondent also have the potential to harm that person's reputation, students may not disclose information about the grievance, including the fact that they have filed a grievance, to any person not immediately involved in the resolution of the case, until the matter has been finally resolved. This is not intended to preclude the student or respondent from seeking legal advice.

1. When a graduate student believes that his/her rights have been violated, as the result of action(s) pertaining to a graduate assistantship he/she holds or has held within the past year, the student shall first discuss his/her concerns with the respondent. If the concerns are not resolved to the student's satisfaction, the student may discuss it with the Dean of the Walton College or his/her designee, and/or with the Office of Affirmative Action. If the concerns are satisfactorily resolved by any of the above discussions, the terms of the resolution shall be reduced to writing, if any of the involved parties desires to have such a written statement.
2. If the student's concerns are not resolved by the above discussions, and he/she chooses to pursue the matter further, the student shall notify the Dean of the Walton College in writing of the nature of the complaint. This notification will include all relevant documentation and must occur within one year from the date of the occurrence. The Dean of the Walton College will inform the Graduate Dean that a grievance has been filed and will, upon request, forward the written complaint and all relevant documentation to the Graduate Dean.
3. Upon receipt of this notification and supporting documentation, the Dean of the Walton College or the Dean's designee will meet with the graduate student. If the student agrees, the Dean or the Dean's designee will notify the respondent of the student's concerns. If the student does not wish for the respondent to be notified, the matter will be dropped. The respondent will be given ten working days from receipt of the Dean's notification to respond to the concerns.
4. The Dean or the Dean's designee will meet again with the student and make an effort to resolve the concerns in a mutually satisfactory manner. If this is not possible, the Dean will refer the case to a committee.
5. Within ten working days from the final meeting between the student and the Dean, the Dean will notify the respondent and will appoint an ad hoc committee of five faculty members and two graduate students chosen to avoid bias or partiality. The Associate Dean of the Walton College or the Dean's designee will serve as the chair of the grievance committee and will vote only in the case of a tie. A voting member of the Walton College Masters Advisory Committee will serve as the non-voting secretary of the committee. At this time, the Dean will also assign an advocate to the student. The advocate must be a member of the graduate faculty. The immediate supervisor of the respondent will serve as his/her advocate. Note: The student and respondent advocates will have the responsibility to help the student/respondent prepare his/her written materials and will attend committee meetings with the student/respondent. The advocate will not speak on behalf of the student/respondent and will not take part in committee discussions of the merits of the case.
6. The committee shall have access to witnesses and records, may take testimony, and may make a record by taping the hearing. Its charge is to develop all pertinent factual information (with the exception that the student and respondent will not be required to be present in any meeting together without first agreeing to do so) and, on the basis of this information, to make a recommendation to the Dean of the Walton College either to support or reject the grievance. The Dean will then make a decision based on the committee's recommendation and all documents submitted by the parties involved. The Dean's decision, the committee's written recommendation, and a copy of all documents submitted as evidence by any party to the complaint, consistent with all privacy considerations, shall be forwarded to the person(s) alleging the grievance within 20 working days from the date the

committee was first convened; copies shall be sent simultaneously to other parties involved in the grievance. A copy shall be retained by the Graduate School of Business in such a way that the student's and respondent's privacy is protected.

7. If the decision of the Dean of the Walton College is that the student's concerns should be addressed, the respondent may appeal to the Provost/Vice Chancellor for Academic Affairs of the University, as outlined below in step 10. It should be noted that the Graduate Dean has limited authority to require a sponsor to reappoint a graduate assistant. Consequently, the redress open to the student may be limited.
8. If the decision of the Dean is that the student's concerns should not be addressed, the student may appeal to the Graduate Dean, as outlined below in step 9.
9. If the grievance is not satisfactorily resolved through step 6, an appeal in writing and with all relevant material may be submitted for consideration to the Graduate Dean. This appeal must be filed within 20 working days of receiving the decision of the Dean of the Walton College. Any appeal at this level shall be on the basis of the complete written record and may involve interviews with any party to the grievance. The Graduate Dean shall make a decision on the matter within 20 working days from the date of receipt of the appeal. His/her decision shall be forwarded in writing to the Walton College Dean, the student, and the respondent.
10. Either party to the grievance may appeal the decision of the Graduate Dean by appealing to the Provost/Vice Chancellor for Academic Affairs of the University of Arkansas. The appeal must be submitted in writing and with all relevant material attached. This appeal must be filed within 20 working days of receiving the decision of the Graduate Dean. Any appeal at this level shall be on the basis of the complete written record only and will not involve interviews with any party to the grievance. The Provost/Vice Chancellor for Academic Affairs shall make a decision on the matter within 20 working days from the date of receipt of the appeal. His/her decision shall be forwarded in writing to the Graduate Dean, the Dean of the Walton College, the student and the respondent. This decision is final.
11. If any party to the grievance violates this policy, he/she will be subject to either losing the assistantship position or losing the assistantship. When alleging such a violation, the aggrieved individual shall contact the Walton College Dean or the Graduate Dean, in writing, with an explanation of the violation.

DEGREES OFFERED

The faculty of the Graduate School, under the authorization of the Board of Trustees, grants the following degrees offered by the Graduate School of Business. The graduate faculty, as represented by the Dean of the Graduate School and through the Graduate Council, has primary responsibility for the development, operating policies, administration, and quality of these programs. Operating through the Graduate Dean, the faculty appoints committees that directly supervise the student's program of study and committees, which, in turn, monitor research activities and approve theses and dissertations.

Doctor of Philosophy
- Economics
- Business Administration
  - *Concentration Areas:*
  - Accounting
  - Information Systems
  - Finance
  - Management
  - Marketing and Transportation

Master of Accountancy
Master of Arts in Economics
Master of Business Administration
Master of Information Systems
Master of Transportation and Logistics Management

MASTER'S DEGREES

MASTER OF ACCOUNTANCY

Marinus Bouwman
Program Coordinator
479-575-6117

The Master of Accountancy (M.Acc.) program is accredited by the AACSB International – The Association to Advance Collegiate Schools of Business. AACSB accreditation assures quality and promotes excellence and continuous improvement in undergraduate and graduate education for business administration and accounting.

The Master of Accountancy program provides rigorous preparation at the graduate level for students to achieve success in their chosen career path in public practice, industry, or government. Students entering the program are expected to have an undergraduate degree or significant background in accounting. Building on the knowledge developed as an undergraduate, the M.Acc. courses broaden, extend, and integrate the student's knowledge. Students completing the M.Acc. program develop the following skills: 1) Research: Students will be able to access, assess, and apply the appropriate standards, regulations, or other information needed to address accounting and business problems. 2) Risk Analysis: Students will understand business risk, how it affects decisions and how to create strategies to mitigate risk. 3) Problem Solving and Decision Making: Students will be able to identify problems, consider alternative solutions, analyze the pros and cons of each alternative and support their conclusions. The M.Acc. program is a full-time program designed to be completed in one year.

Admission to Degree Program: The M.Acc. program is open to students who have an acceptable undergraduate grade-point average, an acceptable Graduate Management Admission Test (GMAT) score, and (international students only) an acceptable TOEFL or IELTS score. Students entering the program are expected to possess a basic understanding of statistics, mathematics, information systems, accounting, and business. Course work deficiencies must be resolved at the beginning of the program.

Requirements for the Master of Accountancy Degree: Students with appropriate backgrounds in business administration and economics and with an undergraduate concentration in accounting will be required to complete 30 semester hours of course work beyond the baccalaureate degree, at least 21 semester hours of which must be in courses reserved exclusively for graduate students. Prior accounting and computer courses must either have been successfully completed within the five years prior to entry to the M.Acc. program, or the student must provide other evidence of current knowledge in these areas. Otherwise, applicants may be required to repeat selected courses.

All students must be enrolled for a minimum of 12 hours during consecutive fall/spring semesters. The student must be in residence a minimum of 24 weeks (see residency requirements of the Master of Arts/Master of Science).

Course work in the accounting discipline beyond introductory accounting must include coverage of each of the following areas:

a. financial accounting and accounting theory
b. management accounting and cost accounting
c. accounting information systems
d. financial and operational auditing
e. taxation

Eighteen semester hours of accounting are required, 12 hours of which are specified:

ACCT 5413 Accounting Issues for Restructuring
ACCT 5433 Fraud Prevention and Detection
ACCT 5443 Asset Management
ACCT 5463 Contemporary Accounting Issues

Nine semester hours of the student's program must be non-accounting electives. Three semester hours may be either accounting or non-accounting electives.

A student may transfer to the M.Acc. program not more than six hours of graduate level credit from an AACSB-accredited graduate program, provided that each course has a grade of "B" or better, and the courses are acceptable to the departmental M.Acc. committee. Students contemplating transfer of credit should consult in advance with both the M.Acc. Adviser and the Graduate School of Business.

In addition to the degree requirements noted above, students with no undergraduate work in business administration and economics will be required to complete the courses or their equivalents listed below. Students with some background in business administration and economics, but with deficiencies in the following areas, will be required to remove these deficiencies as soon as possible.

- Financial management
- Legal environment
- Management concepts/organization behavior
- Management information systems
- Marketing principles
- Microeconomics and macroeconomics
- Production/operations management
- Statistics

A cumulative grade-point average of 3.00 is required on 1) graduate work taken for the degree and 2) all accounting courses (both undergraduate and graduate) taken for the degree. At least 75 percent of the graduate credit hours submitted for the degree must be "A" or "B" grades. The M.Acc. degree program does not require a thesis. Successful completion of a Master of Accountancy Degree from the University of Arkansas will qualify a student to take relevant professional examinations.

For further information, write to the M.Acc. Adviser, Department of Accounting, Walton College of Business, University of Arkansas, Fayetteville, AR 72701.

MASTER OF ARTS IN ECONOMICS

Raja Kali
Program Coordinator
479-575-6219

Prerequisites to Degree Program: Applicants for graduate studies in economics must meet the requirements of the Graduate School of Business and be accepted by the Department of Economics. Generally, the requirements are: 1) a bachelor's degree from an accredited institution with a satisfactory grade-point average, and 2) a satisfactory score on the Graduate Record Examinations (GRE). Students from all academic backgrounds are encouraged to apply. To take graduate courses in economics, students, as a general rule, must have had courses in intermediate microeconomics and macroeconomics, basic statistics, two semesters of calculus, and linear algebra.

Degree Options: Students must select the Non-Thesis or Thesis option. Both options combine a study of economic theory, applied econometrics and an applied field that will prepare students for careers in the private or public sector, or for doctoral programs. The Non-Thesis option can be completed in 10 months – two semesters plus an intensive 3-week course in mathematics and statistics taken immediately before the start of the entering fall semester. The Thesis option is for students who seek more advanced skills. It requires additional coursework and a thesis, and will take three or four semesters to complete.

Common Requirements for the Master of Arts Degree, Non-Thesis and Thesis Options: Candidates for both the Non-Thesis and Thesis options must complete a minimum of 30 hours of coursework that includes the following:

Core Requirements: 24 hours
ECON 5233 Mathematics for Economic Analysis
ECON 5533 Microeconomic Theory I
ECON 6233 Microeconomic Theory II
ECON 5433 Macroeconomic Theory I
ECON 6243 Macroeconomic Theory II
ECON 5613 Econometrics I
ECON 5623 Econometrics II
ECON 643V Fall Seminar
ECON 644V Spring Seminar

Applied Field Concentration: 6 hours. Each student shall complete at least six hours of coursework in one applied field. Students who seek advanced training in applied economics and business preparatory to entering business or government employment should select one of the following fields: finance, accounting, marketing, transportation, information systems, or quantitative methods. Students who plan to enter a doctoral program should choose mathematics or statistics as their field. Other concentrations are possible with the approval of the Program Coordinator.

Seminars: Students are required to register for the seminar courses for at least one credit hour each semester they are on campus.

Additional Degree Requirements, Non-Thesis Option (30 hours): In addition to 30 hours of required coursework, students who select the non-thesis option must take a comprehensive exam. For these students, a Masters Paper will typically be integrated with Econometrics II and the Spring Seminar classes. Presentation of the Masters Paper to the faculty and students during the Seminar course will constitute the final comprehensive exam.

Additional Degree Requirements, Thesis Option (Minimum of 42 hours): This option is intended for students who seek the acquisition of advanced analytical and research skills. Students who select the Thesis option must pass 30 hours of required coursework specified above, 12 additional hours of coursework – 6 hours approved by the Program Director and 6 hours of thesis credit, and pass a comprehensive exam. The comprehensive exam will take the form of a formal thesis defense.

Financial Assistance: A limited number of merit based graduate assistantships are awarded to students, typically for one year of study. Students in the Thesis option may be considered for continued funding after the first year of the Masters program if they possess a minimum GPA of 3.75 in their graduate coursework during their first year in the program and are recommended by the graduate committee in economics. Such funding will be offered strictly on the basis of merit and is subject to availability of funds.

MASTER OF BUSINESS ADMINISTRATION

See Business Administration Department for course listings.

Alan Ellstrand
MBA Program Director
479-575-2851

The Master of Business Administration program is accredited by the Association to Advance Collegiate Schools of Business (AACSB International). The M.B.A. degree is directed at students preparing for a professional career. It requires 38-48 graduate credit hours of study for students with an adequate undergraduate background.

Students without the necessary academic background may be required to take additional hours prior to enrollment in the M.B.A. program. Two plans of study are offered: the full-time program and the managerial (part-time) program. The full-time program can be finished in 16 months; the managerial program requires a minimum of 24 months of study. The degree is a non-thesis program. See page 31 for M.B.A. academic dismissal policy.

The full-time MBA program comprises 28 hours of core courses, a 9 hour concentration track, 5 hours of professional development, a 3 hour consulting project or a 4th graduate business elective, and a 3 hour internship or study abroad for a total of 48 credit hours. The part-time managerial MBA program is a lock-step sequence beginning with an introduction to the value chain, eight core business courses, a capstone project, and a two-course sequence in strategic retail management.

Areas of Concentration: The M.B.A. full-time program has four defined areas of concentration: Retail Marketing Management, Supply Chain Management, Financial Management, and Entrepreneurship and Innovation. The Managerial MBA program offers a single concentration in value chain optimization in the consumer products and retail sectors.

Prerequisites to Degree Program: Students entering the M.B.A. program are expected to have already mastered basic business concepts in the areas of information technology, quantitative analysis, accounting, finance, economics, marketing, management, and business law. Mastery of the aforementioned topics must be demonstrated before entering the program.

Admission to Degree Program: Students must be admitted to the Graduate School of Business and to the M.B.A. program by the M.B.A. Admissions Committee. Admission to the M.B.A. program is based upon an acceptable Graduate Management Admission Test (GMAT) score, an acceptable grade-point average, recommendations, essays, and related work experience. For specific admission requirements in addition to general admission requirements for the M.B.A. program, write to:

MBA Program Director
475 Business Building
1 University of Arkansas
Fayetteville, AR 72701

Requirements for the Master of Business Administration Degree, Full time Program:

Spring I (16 hours)
- MKTT 5103 Retail Consumer Marketing
- TLOG 5633 Retail & Consumer Products Supply Chain Management
- FINN 5223 Financial Markets & Valuation
- ISYS 5363 Business Analytics
- ECON 5243 Economics of Supply Chain & Retail
- MBAD 5511Special Topics in Business

Summer (3 hours)
- MBAD 5353 MBA Internship
- Or MBAD 5363 Special Problems in Business: Study Abroad

Fall (15 hours)
- MGMT 5223 Managing and Leading Organizations
- ACCT 5223 Accounting for Supply Chain & Retail Operations
- MBAD 5241 Ethical Decision Making
- MBAD 5511 Special Topics in Business
- MBAD 5511 Special Topics in Business
- Career Track Course
- Career Track Course

Spring II (14 hours)
- MGMT 5313 Strategic Management
- ISYS 5433 Enterprise Systems
- MBAD 5413 Partnering Project or a 4th graduate business elective
- MBAD 5511 Special Topics in Business
- Career Track Course

Full-time MBA Defined Career Tracks

Retail Marketing Management
- MKTG 5553 Shopper, Buyer, and Consumer Behavior
- MKTG 5433 Consumer and Marketing Research
- MKTG 5543 Category Analysis & Management

Supply Chain Management
- TLOG 5653 Global Logistics and Supply Chain Management
- TLOG 5643 Transportation Strategies in the Supply Chain
- TLOG 5673 Modeling Retail and Consumer Products Logistics

Financial Management
- FINN 5443 Retail Finance
- FINN 5333 Investment Theory and Management
- FINN 5413 Shollmier Portfolio Class

Entrepreneurship & Innovation
- MGMT 5323 New Venture Creation
- MGMT 5363 Innovation & Creativity
- MKTT 5433 Consumer and Market Research OR
- WCOB 510V Special Topics in Business: Entrepreneurial Finance

Managerial (part-time) Program:

Pre-Fall
- MBAD 5602 Introduction to the Value Chain

Fall
- MBAD 5613 Financial Accounting
- MBAD 513V Information Technology and Decision Making

Spring
- MBAD 5232 Economics of Management and Strategy
- MBAD 511V Corporate Financial Management

Summer
- MBAD 521V Leading High Performance Organizations
- MBAD 512V Accounting Decisions and Control

Fall
- MBAD 5222 Managing Ideas, Products, and Services
- TLOG 5663 Supply Chain Management

Spring
- MGMT 5313 Strategic Management
- MKTG 5333 Retailing Strategy and Processes

Summer
- MBAD 5433 Capstone Project
- MBAD 5533 Strategic Category Management

M.B.A./J.D. Program

For students interested in obtaining both the M.B.A. and J.D. (law) degrees, the M.B.A./J.D. dual degree program is available. This program allows the student to receive both the M.B.A. degree and the J.D. degree. The program requires separate application and admission to both the School of Law and the Graduate School of Business and the M.B.A. degree program. Students participating in the M.B.A./J.D. program must file a degree plan for both degrees and obtain approval prior to taking elective courses to be used for reciprocal credit. Interested students should obtain bulletins and applications from both the School of Law and the Graduate School of Business.

MASTER OF INFORMATION SYSTEMS

Paul Cronan
MIS Director
479-575-6130
E-mail: cronan@uark.edu

The Master of Information Systems is designed to provide professional preparation for positions in business and government. It is designed with sufficient flexibility to meet the needs of students with various backgrounds and foster lifelong learning and innovation. Students may concentrate in one of five areas: Information Technology Management, Enterprise Resource Planning (ERP) Management, Telecommunications Management, Software Engineering Management, or Transportation/Logistics Technology Management.

Admission Requirements: The Master of Information Systems program is open to students who have earned a bachelor's degree from an accredited institution and who can present evidence of their ability to do graduate work. "Evidence of ability" means superior grade-point average, an acceptable test score on the Graduate Management Admission Test (GMAT), and recommendations with respect to ability for successful pursuit of graduate-level work. International applicants and resident aliens must submit a minimum score of 550 on the paper-based or 213 on the computer-based Test of English as a Foreign Language (TOEFL) or a minimum score of 6.5 on the IELTS taken within the preceding two years, or complete the Intensive English Language Program (Spring International Language Center) and receive an English proficiency recommendation for admission. International applicants must also submit a minimum score of 50 on the TSE (Test of Spoken English).

Requirements for the Master of Information Systems Degree: The Master of Information Systems is a 30 credit-hour program designed to provide professional information systems preparation for positions in business and government. Students whose previous studies have fulfilled requirements of the common body of knowledge in business and information systems will be required to complete a minimum of 30 hours of graduate work. The required common body of knowledge in Information Systems includes programming languages such as Visual Basic or Cobol, management information systems, systems analysis, and database.

Core Courses (9 hours - required for all areas of concentration):
- ISYS 5423 Seminar in Systems Development
- ISYS 5833 Data Management Systems
- ISYS 5943 Management of Information Technology Seminar

Areas of Concentration (12 hours):

Information Technology Management
- ISYS 5503 Decision Support Systems
- ISYS 5713 Seminar in Telecomm
- Computing Electives (6 hours) selected from ISYS, CENG, and CSCE

Enterprise Resource Planning (ERP) Management
- ISYS 5503 Decision Support Systems
- WCOB 5213 ERP Fundamentals

Select 6 hours from:
- ISYS 5843 Seminar in Bus. Intelligence and Knowledge Mgmt.
- WCOB 5223 ERP Configuration and Implementation
- ISYS 5233 Seminar in ERP Development
- CSCE/ISYS Enterprise Systems electives

Telecommunications Management
- ISYS 5713 Seminar in Telecomm

Select 9 hours from:
- CENG 4753 Computer Networks
- CENG 4953 Minicomputer Applications
- CENG 4343 Windows/GUI
- CENG 4823 Graphics and Animation

Software Engineering Management
- ISYS 5503 Decision Support Systems

Select 9 hours from:
- ISYS 4333 O-O Technologies Seminar
- CENG 4533 O-O Programming and Design
- CENG 4953 Minicomputer Applications
- CENG 5023 Software Engineering I
- CENG 5033 Software Engineering II
- CENG 4813 Computer Graphics

Transportation/Logistics Technology Management
- ISYS 5503 Decision Support Systems, or ISYS 5713 Seminar in Telecomm
- TLOG 5633 Retail & Consumer Products Supply Chain Management
- TLOG 5673 Modeling Retail and Consumer Products Logistics

Select 3 hours from:
- TLOG 5643 Transportation Strategies in the Supply Chain
- TLOG 5653 Global Logistics and Supply Chain Management
- TLOG 5663 Supply Chain Management
- TLOG 560V Special Topics

Electives: 9 hours
Total Hours: 30

Professional M.I.S. (Part-time) Program:

Fall, Year 1
- ISYS 5423 Seminar in Systems Development
- ISYS 5503 Decision Support Systems

Spring
- ISYS 5833 Data Management Systems
- WCOB 5213 ERP Fundamentals

Summer
- ISYS 5933 Global IS
- Elective (3 hours) from TLOG, MGMT, WCOB, or CSCE

Fall, Year 2
- ISYS 5843 Seminar in Bus. Intelligence and Knowledge Mgmt.
- ISYS 4373 O-O Programming for Business Applications

Spring
- ISYS 5133 E-Business Development
- ISYS 5943 Management of Information Technology Seminar

Electives are chosen by the student in consultation with the Masters of Information Systems Program Director in the Department of Information Systems (ISYS). Approved electives (9 hours) may be any graduate course approved by the Masters Program Director, but only three hours of ISYS courses are permitted.

Note: With the approval of the Masters Program Director, any senior level ISYS course (ISYS 4000+) may be taken for graduate credit. CSCE is Computer Science. CENG is Computer Engineering.

After admission, the student must maintain a 3.00 grade-point average on all graduate coursework and all information systems coursework. Additionally, the student must receive a letter grade of at least a "B" in 75 percent of the courses attempted.

MASTER OF TRANSPORTATION AND LOGISTICS MANAGEMENT

See Marketing & Logistics for course listings.

Matthew Waller
Program Coordinator
479-575-8741

The Master of Transportation and Logistics Management program is designed to produce outstanding professionals in the fields of transportation and logistics. Graduates of the program will be able to take positions within business firms or governments agencies. The program is designed with sufficient flexibility to meet the needs of students with various backgrounds and work experience. Students

can pursue the Master of Transportation and Logistics Management degree on either a conventional full-time or a convenient part-time basis through evening classes.

Admission Requirements: The Master of Transportation and Logistics Management program is open to students who have earned a bachelor's degree from an accredited institution and who can present evidence of their ability to do graduate work. "Evidence of ability" means an excellent grade-point average, an acceptable test score on the Graduate Management Admissions Test (GMAT), recommendations for graduate study, and an acceptable score on the TOEFL or IELTS (unless the native language is English).

Requirements for the Master of Transportation and Logistics Management Degree: The Master of Transportation and Logistics Management program is a 30 credit-hour program designed to provide students with transportation and logistics expertise, general business principles, and quantitative skills in preparation for positions in business firms and government. Students with a bachelor's degree in business administration from an accredited institution will be required to complete 30 hours of graduate work:

TLOG 5633 Retail & Consumer Products Supply Chain Management
TLOG 5643 Transportation Strategies In the Supply Chain
TLOG 5653 Global Logistics and Supply Chain Management
TLOG 5663 Supply Chain Management
TLOG 5673 Modeling Retail and Consumer Products Logistics
Approved engineering electives (6 hours) or approved information systems electives (6 hours)
Concentration (9 hours)
Total: 30 hours

The engineering or information systems electives and concentration courses are chosen by the student in consultation with the M.T.L.M. Coordinator in the Department of Marketing and Logistics (MKTL). Concentrations can be taken in strategic retailing, information technology, international business, enterprise resource planning, or agricultural economics and business. Customization of the concentration courses may be available for exceptional cases in consultation with the M.T.L.M. coordinator. Students without the appropriate background may have to take additional courses to meet prerequisite requirements. A limited number (6 hours) of 4000-level courses may be taken for graduate credit.

After admission, the student must maintain a 3.00 grade-point average on all graduate coursework and all transportation and logistics courses. The student must receive a letter grade of at least a "B" in 75 percent of the courses attempted

Through an agreement with the Academic Common Market, residents of certain Southern states may qualify for graduate enrollment in this degree program as in-state students for fee purposes. See page 237 for details.

DOCTOR OF PHILOSOPHY DEGREE

See page 42 for general information regarding the declaration of intent, residence requirements, candidacy examinations, dissertation requirements, and final examinations.

Application: Applicants for the Ph.D. program in Business Administration or the Ph.D. program in Economics must submit an application for admission, official transcripts from each college or university attended, a statement of purpose, three letters of recommendation, the assistantship application, and a current resume. All documents must be submitted by January 15 for consideration for fall. Applicants for the Ph.D. program in Business Administration must submit a satisfactory GMAT score. Applicants to the Ph.D. program in Economics must submit a satisfactory GRE score.

International Application: International applicants must also submit the summary of educational experience form, and a supplemental and financial information form (required for the I-20 visa). All international applicants, whose native language is not English, must submit either a minimum TOEFL score of 550 paper-based test or 213 computer-based test or a 6.5 IELTS, taken within the preceding two years. Doctoral applicants must also present a minimum score of 50 on the Test of Spoken English (TSE).

The application packet should be submitted to this address:

GRADUATE SCHOOL OF BUSINESS
475 Business Building
University of Arkansas
Fayetteville, AR 72701

PH.D. IN BUSINESS ADMINISTRATION

The Ph.D. in Business Administration is designed primarily to prepare individuals for teaching, research, service, and collegial roles in academic and research institutions. The degree program provides: a) an exposure to the functional areas of business, b) intensive study of the relevant body of knowledge in a concentration, and c) skills and tools to conduct research in that area.

Through an agreement with the Academic Common Market, residents of certain Southern states may qualify for graduate enrollment in this Ph.D. degree program (with emphasis in accounting) as in-state students for fee purposes. See page 237 for details.

Prerequisites to Degree Program

1. Admission to the Graduate School
2. Satisfactory GMAT scores.
3. Satisfactory previous academic record.
4. Admission to a concentration
5. An M.B.A or other appropriate master's degree is generally required for admission. Individuals admitted to the program may be required to take additional courses in accounting, business law, computer information systems, statistics, finance, economics, management, or marketing. The additional courses will be determined by the adviser in the student's concentration with the approval of the Walton College of Business Associate Dean for Academic Affairs.

Requirements for the Doctor of Philosophy Degree: The program consists of the following:

1. **Concentration**
   Emphasis areas may be taken in the following fields:
   Accounting
   Information Systems
   Finance
   Management
   Marketing and Transportation
2. **Course work and seminars**
   The requirements for the Ph.D. in business administration will consist of a program of research, appropriate course work, seminars, and independent study as specified by the student's concentration.
3. **Comprehensive Examination**
   Satisfactory completion of a comprehensive examination in the concentration is required.
4. **Dissertation**
   A dissertation will be written and successfully defended in the concentration.

PH.D. IN ECONOMICS

Prerequisites to Degree Program: Most students must first earn a master's degree and then apply for entry to the doctoral program. In exceptional cases, students may enter the doctoral program immediately upon completion of the bachelor's degree. The requirements for this program include: 1) intermediate theory, 2) two semesters of calculus, 3) statistics, and 4) linear algebra.

Requirements for the Doctor of Philosophy Degree:

The doctoral program consists of

1. Core requirements
2. Fields of specialized study
3. Electives
4. Candidacy and Field Examinations
5. Dissertation
6. Final Examination

Additional course requirements may be requisite for Ph.D. students in those economics classes populated primarily by Masters students.

Core Requirements: All doctoral candidates must satisfactorily complete 33 semester hours of core requirements and applied econometrics field courses listed below. In addition, they must register for the graduate seminar each semester they are in residence.

ECON 5133 Mathematics for Economic Analysis
ECON 5533 Microeconomic Theory I
ECON 6233 Microeconomic Theory II
ECON 6253 Microeconomic Theory III
ECON 5433 Macroeconomic Theory I
ECON 6243 Macroeconomic Theory II
ECON 5613 Econometrics I
ECON 6623 Econometrics II
ECON 6633 Econometrics III
STAT 5103 Theory of Statistics
STAT 5113 Statistical Inference

Seminars: Doctoral students are required to register for ECON 643V or 644V each semester they are in residence. Normally they will register for one hour of credit. However, at one point in their program, usually the last year of course work, they must register for three hours of credit.

Fields of Specialized Study: Students are required to take a field in applied econometrics as well as select a second field that may be in economics or in a complementary field if approved by the economics Program Director. Potential outside fields include Finance, Mathematics, Statistics, Agricultural Economics, Public Policy and Environmental Science. At least two graduate level courses must be taken in each field and a grade of "B" must be earned in each field course. The second year statistics requirements above cannot count towards a field in statistics.

Electives: Two economics course electives are required after completing the first-year core requirements.

Note: foregoing requirements are for students who enter the doctoral program directly from undergraduate school. Students whose qualifications exceed the baccalaureate will be evaluated individually in accordance with standards established by the Graduate School and the Walton College of Business. Students who have earned a master's degree in economics at the University of Arkansas or elsewhere will probably have substantially shorter programs. However, there is a minimum requirement of 24 hours of course work (5000 level and above) beyond that required for a master's degree. Doctoral candidates must have a cumulative grade-point average of 3.25 on all graduate course work.

Dissertation: The dissertation represents a demonstration of a candidate's ability to select, define, organize, and complete a major research project. It should demonstrate that the student has technical mastery of the field, is capable of doing independent scholarly research, and is able to formulate conclusions which enlarge the body of economic knowledge. Dissertation requirements include (1) a defense of proposal, and (2) presentation of an acceptable doctoral dissertation.

Candidacy Examinations for the Doctor of Philosophy: Students must pass written candidacy examinations in microeconomics and macroeconomics. These exams will be given after the student completes the required core courses. The macroeconomics exam will typically be given after the spring semester, and the microeconomics candidacy exam will typically be given after the fall semester. Students who do not pass the exam will have the option to retake it. Students who fail the exam a second time will normally be dismissed from the program.

Field Examination in Applied Econometrics: Students must pass a written field examination in applied econometrics that will normally be given after the first spring semester.

Final Examination: The final examination is normally an oral defense of the student's dissertation.

Graduate School of Business Departments and Course Descriptions

ACCOUNTING (ACCT)

Karen V. Pincus
Department Chair and S. Robson Walton Chair in Accounting
401 Walton College of Business
479-575-4051

Don W. Finn
Ph.D. Program Director
Walton College of Business
479-575-6157

- Doris M. Cook Chair in Accounting Professor Callahan
- S. Robson Walton Chair in Accounting Professor Pincus
- Walter B. Cole Chair of Accounting Professor Bouwman
- Garrison-Wilson Chair in Accounting Professor Finn
- Ralph McQueen Chair of Accounting Professor Richardson
- Associate Professor and Nolan E. Williams Lecturer in Accounting Thomas
- Associate Professor and BKD Lecturer in Accounting West
- Associate Professor Peters
- Assistant Professors Henderson, Sanchez, Smith
- Clinical Associate Professor Leflar
- Instructor Shook

Degrees Conferred:

M.Acc. (ACCT)
Ph.D. in Business Administration

Accounting (ACCT)

ACCT410V Special Topics in Accounting (Irregular) (1-3) Explore current events, concepts and new developments relevant to Accounting not available in other courses. Prerequisite: WCOB 2013 and WCOB 2023 and WCOB 2033 and WCOB 2043 each with a grade of "C" or better. May be repeated for 99 hours.

ACCT4673 Product, Project and Service Costing (Sp, Fa) Cost systems with emphasis on information generation for cost management of products, projects and services. Prerequisite: ACCT 3533 and ACCT 3613 each with a grade of "C" or better.

ACCT4753 Generally Accepted Accounting Principles (Sp, Fa) The origins, uses, and application of generally accepted accounting principles. Emphasizes researching technical accounting pronouncements for application to external financial reporting issues. Prerequisite: graduate standing or ACCT 3723 with a grade of "C" or better.

ACCT4963 Operational Auditing (Sp, Fa) The audit of efficiency, effectiveness, and performance of business and nonbusiness entities. Includes coverage of performance auditing techniques and application of these techniques to financial and nonfinancial functions. Prerequisite: senior standing, WCOB 3016 and completion of all junior-level BA core and completion of junior-level accounting courses with a grade of "C" or better.

ACCT5223 accounting for Supply Chain & Retail Organizations (Fa) Highlights the role played by accounting information in managing supply chains and retail operations. Provides tools for managing cost flows, including activity-based costing, retail accounting, operational and capital budgeting. Focuses on improving decision making processes, and linking the impact of retail/supply chain decisions to financial statements and shareholder value. May be repeated.

ACCT5413 Accounting Issues for Restructurings (Fa) Integrated course which examines the financial reporting, tax, managerial, systems and auditing aspects of major corporate restructurings arising from events such as mergers, acquisitions, spinoffs, reorganizations and downsizing. Prerequisite: ACCT 4753 with a grade of "C" or better.

ACCT5433 Fraud Prevention and Detection (Fa) An examination of various aspects of fraud prevention and detection, including the sociology of fraud, elements of fraud, types of fraud involving accounting information, costs of fraud, use of controls to prevent fraud, and methods of fraud detection. Prerequisite: MBAD 5112 and MBAD 5122 and ISYS 2263 with a grade of "C" or better.

ACCT5443 Asset Management (Sp) Acquisition and management of inventories, tangible capital assets, and intangible assets. Included are issues such as acquisition processes, internal controls, system requirements, accounting measurements, inventory models, re-engineering, capital budgeting, and tax implications. Prerequisite: MBAD 5112 and MBAD 5122 and ISYS 2263 each with a grade of "C" or better.

ACCT5463 Contemporary Accounting Issues (Sp) Cross-functional seminar on emerging issues in accounting. Prerequisite: ACCT 5413 and ACCT 5433.

ACCT549V Special Topics in Accounting (Sp, Su, Fa) (1-3) Seminar in current topics not covered in other courses. Course is taught in separate 1-hour units, each with a different topic and instructor. Students may enroll in one or more units. May be repeated for 3 hours.

ACCT5523 Advanced Accounting Information Systems (Sp) This course describes accounting systems in technologically advanced environments. Controls and other technical design considerations are described for the input, processing, storage, and reporting of accounting information. Special topics, such as expert systems and artificial intelligence applications in financial accounting, auditing, and tax also receive considerable attention. Prerequisite: MBAD 5112 and MBAD 5122 and ISYS 2263 with a grade of "C" or better.

ACCT5873 Advanced Taxation (Fa) A review of the more complex tax issues, focusing on the tax problems encountered by various forms of business entities. Prerequisite: ACCT 3843 or equivalent with a grade of "C" or better.

ACCT5883 Individual Tax Planning (Sp) A review of the financial planning opportunities available to individuals, focusing on tax implications of personal business decisions. Prerequisite: MBAD 5112 and MBAD 5122 and ISYS 2263 with a grade of "C" or better or ACCT 3843 with a grade of "C" or better.

ACCT5953 Assurance Services (Fa) The expression of assurance on financial statements and other forms of information for decision makers. Includes risk assessment, evidence gathering, and reporting. Prerequisite: ACCT 4753 with a grade of "C" or better.

ACCT6011 Graduate Colloquium (Sp, Fa) Presentation and critique of research papers and proposals.

ACCT6033 Accounting Research Seminar I (Fa) First course in the accounting research seminar sequence which explores and evaluates current accounting literature. Course content reflects recent developments in the literature and specific interests of participants. Examples of potential topics include research methods in accounting, managerial accounting, behavioral accounting,

ACCT6133 Accounting Research Seminar II (Sp) Second course in the accounting research seminar sequence which explores and evaluates current accounting literature. Course content reflects recent developments in the literature and specific interests of participants. Examples of potential topics include research methods in accounting, financial accounting, managerial accounting, behavioral accounting, tax, audit, international accounting, and education. Prerequisite: ACCT 6033.

ACCT6233 Accounting Research Seminar III (Fa) Third course in the accounting research seminar sequence which explores and evaluates current accounting literature. Course content reflects recent developments in the literature and specific interests of participants. Examples of potential topics include research methods in accounting, financial accounting, managerial accounting, behavioral accounting, tax, audit, international accounting, and education. Prerequisite: ACCT 6033.

ACCT636V Special Problems in Accounting (Sp, Su, Fa) (1-6) Special research project under supervision of a graduate faculty member.

ACCT6433 Accounting Research Seminar IV (Sp) Fourth course in the accounting research seminar sequence which explores and evaluates current accounting literature. Course content reflects recent developments in the literature and specific interests of participants. Examples of potential topics include research methods in accounting, financial accounting, managerial accounting, behavioral accounting, tax, audit, international accounting, and education. Prerequisite: ACCT 6033.

ACCT6633 Accounting Research Seminar V (Sp, Su, Fa) Fifth course in the accounting research seminar sequence which explores and evaluates current accounting literature. Course content reflects recent developments in the literature and specific interests of participants. Examples of potential topics include research methods in accounting, financial accounting, managerial accounting, behavioral accounting, tax, audit, international accounting, and education. Prerequisite: ACCT 6033.

ACCT700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

BUSINESS ADMINISTRATION (WCOB)

William P. Curington
Associate Dean for Academic Affairs
328 Walton College of Business
479-575-2851

Faculty are listed by department.

Degrees Conferred:

M.B.A.
Ph.D in Business Administration

Walton College of Business (WCOB)

WCOB500V Study Abroad (Sp, Su, Fa) (1-6) (First Offered Summer 2002, Formerly BADM 500) Open to graduate students studying abroad in officially sanctioned programs. May be repeated for 12 hours.

WCOB510V Special Topics in Business (Irregular) (1-3) Special business topics of an interdisciplinary nature. May be repeated for 6 hours.

WCOB5213 ERP Fundamentals (Sp) An introduction to enterprise resource planning systems. Students should gain an understanding of the scope of these integrated systems that reach across organizational boundaries and can change how a company does business. Implementation issues are covered, including the importance of change management. Prerequisite: graduate standing.

WCOB5223 ERP Configuration and Implementation (Sp) The process of configuring and implementing an enterprise resource planning system. Business process analysis and integration. Students will develop a company and set up several modules in SAP R/3 for use. Develop understanding of how the business processes work and integrate. Prerequisite: WCOB 5213 with a grade of "C" or better.

WCOB6111 Seminar in Business Administration Teaching I (Fa) (First Offered Summer 2002, Formerly BADM 6111) This course in college level teaching is designed for graduate students and new college teachers with specific emphasis on the Business Administration learning and classroom management. The purpose of this course is to introduce graduate students to principles of teaching and learning and to prepare these future teachers to lifelong learners in the classroom as teachers. Prerequisite: graduate standing.

WCOB6121 Seminar in Business Administration Teaching II (Sp, Fa) (First Offered Summer 2002, Formerly BADM 6121) Given that the student has successfully completed Seminar in Business Administration Teaching I, this course is suggested as the second course in the sequence. It is designated a 'hands on' teaching course. Students will be assigned a class to teach by their respective department and will be supervised. In addition, all students in the class will come together for seminar discussion twice per month. Prerequisite: WCOB 6111 or equivalent.

WCOB6131 Seminar in Business Administration Teaching III (Sp, Fa) (First Offered Summer 2002, Formerly BADM 6131) This is an advanced course in college level teaching designed for graduate students and new college teachers with specific emphasis on the Business Administration learning and classroom management. The purpose of this course is to enhance graduate students' knowledge of teaching pedagogy given a base knowledge and classroom experience. This course will focus on current and advanced topics of teaching and learning, as well as research in teaching. Prerequisite: WCOB 6111 or equivalent, WCOB 6121 suggested.

Master of Business Admin (MBAD)

MBAD511V Corporate Financial Management (Fa) (2-3) Financial analysis, planning and control; decision making and modeling for financial managers; and financial policies for management. Corequisite: MBAD 5132 and MBAD 5222. Prerequisite: MBAD 5122 and MBAD 5212 and MBAD 5232.

MBAD512V Accounting Decisions and Control (Fa) (2-3) Preparation and utilization of financial information for internal management purposes: planning and special decisions, cost determination, performance evaluation, and controls. Corequisite: MBAD 5212 and MBAD 5232.

MBAD513V Information Technology and Decision Making (Fa) (2-3) Utilization of information, quantitative techniques, and computer application in decision making and problem solving for managers. Corequisite: MBAD 5112 and MBAD 5222. Prerequisite: MBAD 5122 and MBAD 5212 and MBAD 5232.

MBAD521V Leading High Performance Organizations (Sp, Fa) (2-3) Managing in a global workforce, including human resource issues, motivation, performance evaluation, quality concepts, transformational leadership, and selection/ recruitment/ development of employees. Corequisite: MBAD 5122 and MBAD 5232.

MBAD522V Managing Ideas, Products, and Services (Sp, Fa) (2-3) Product management, market research, marketing communications, retailing and distribution, consumer behavior, and social and ethical implications of marketing. Corequisite: MBAD 5112 and MBAD 5132. Prerequisite: MBAD 5122 and MBAD 5212 and MBAD 5232.

MBAD523V Economics of Management and Strategy (Sp, Fa) (2-3) Information economics and applied game theory. Corequisite: MBAD 5212 and MBAD 5122.

MBAD5241 Ethical Decision Making (Fa) Business Ethics will address business ethics issues from a personal, professional, and organizational perspective. We will cover basic ethical decision-making frameworks to help inform students' personal moral frameworks, ethical issues that are most relevant to managers of modern organizations, and the role of busi-

ness in society May be repeated.
MBAD535V MBA Internship (Su) (1-3) This course allows a student to experience an internship within a business and benefit from the applied experience. The internship may be designed to offer a wide range of business experiences. The internship must be supervised by a faculty member as well as a member of the firm. The course may be taken for 1-3 credits. MBA Director approval required May be repeated for 3 hours.
MBAD536V Study Abroad-Special Problems (Su) (1-3) Provides MBA students with the opportunity to explore a business problem in depth under the guidance of a graduate faculty member. MBA Director approval required. May be repeated.
MBAD5413 Partnering Project (Sp) A large-scale, real world, 10 week project involving hands-on work addressing issues faced by managers in partnering firms. Corequisite: MBAD 5313 and MBAD 5423.
MBAD5433 Capstone Project (Odd years, Fa) A large-scale project integrating various business topics. Corequisite: MBAD 5313.
MBAD5511 Professional Development — Special Topics In Business (Sp, Fa) A concentrated emphasis on one business topic. Corequisite: MBAD 5212, MBAD 5122 and MBAD 5232. Prerequisite: MBAD 5023. May be repeated for 5 hours.
MBAD5602 Introduction to the Value Chain (Su) An introduction to the value chain concept, the underlying framework of the Managerial MBA program. Topics include the primary value chain activities of inbound logistics, operations, outbound logistics, marketing and sales, and service, as well as the support activities of procurement, technology development, human resource management and firm infrastructure. May be repeated.
MBAD5613 Financial Accounting (Fa) This course covers the preparation and use of financial statements of publicly held corporations in the United States. Topics include the theory and rules used in financial statement preparation, a comparison of United States rules to International Accounting Standards, the analysis of financial statements to provide inter-company and industry comparisons and information about the financial statements of non-profit and governmental organizations. May be repeated.

ECONOMICS (ECON)

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- Distinguished Professor and Phillips Petroleum Chair Murray
- Margaret Gerig and R.S. Martin Jr. Chair in Business Farmer
- Professors Britton, Curington, Dixon, Gay, Ziegler
- Professor and Lewis E. Epley Jr. Professorship in Economics Ferrier
- Associate Professors Horowitz, Kali
- Assistant Professors Deck, Lee, Mendez, Reyes
- Visiting Assistant Professor Collins
- Clinical Assistant Professor Stapp

Degrees Conferred:

M.A., Ph.D. (ECON)

Economics (ECON)

ECON4433 Experimental Economics (Sp) The course offers an introduction to the field of experimental economics. Included are the methodological issues associated with developing, conducting, and analyzing controlled laboratory experiments. Standard behavioral results are examined and the implications of such behavior for business and economic theory are explored. Prerequisite: ECON 2023 or ECON 2143.
ECON512V Workshop in Economic Education (Irregular) (1-3) Overview of basic economic facts and principles with emphasis on means of employing them in the curriculum of elementary and secondary schools. Not open to majors in business and economics. Offered for degree credit in Education only. May be repeated for 3 hours.
ECON5233 Mathematics for Economic Analysis (SU) This course will develop mathematical and statistical skills for learning economics and related fields. Topics include calculus, static optimization, real analysis, linear algebra, convex analyisi, and dynamic optimization. Prerequisite: Graduate standing and MATH 2554 or equivalent.
ECON5243 Economics of Supply Chanin & Retail (Sp) This course will provide students with a strong foundation in core economics principles, with emphasis on industrial organization issues and applications geared toward the supply-chain and retail focus of the redesigned MBA program. May be repeated.
ECON5333 Economics of Organizations (Irregular) An economic perspective on the design of organizations. Applies developments in game theory and contract theory to analyze the role of information and incentives within and between firms. Covers the boundaries of firms, integration and outsourcing, authority and incentives, and alternative organizational structures in an evolving business environment.
ECON5433 Macroeconomic Theory I (Su, Fa) Theoretical development of macroeconomic models that include and explain the natural rate of unemployment hypothesis and rational expectations, consumer behavior, demand for money, market clearing models, investment, and fiscal policy.
ECON5533 Microeconomic Theory I (Su, Fa) Introductory microeconomic theory at the graduate level. Mathematical formulation of the consumer choice, producer behavior, and market equilibrium problems at the level of introductory calculus. Discussion of monopoly, oligopoly, public goods, and externalities.
ECON5563 History of Economic Thought (Fa) Seminar in development of economic ideas, theories; causes and development of schools of thought emphasized.
ECON5613 Econometrics (Fa) Use of economic theory and statistical methods to estimate economic models. The single equation model are examined emphasizing multicollinearity, autocorrelation, heteroskedasticity, binary variables and distributed lags. An introduction to the simultaneous systems model is presented. Two 80 min. lecture periods weekly. Prerequisite: MATH 2043 and knowledge of matrix methods, which may be acquired as a corequisite and (AGEC 1103 or ECON 2023) and an introductory statistics course. (Same as AGEC 5613)
ECON5853 International Economics Policy (Sp) An intensive analysis of the operation of the international economy with emphasis on issues of current policy interest. Prerequisite: ECON 5163.
ECON600V Master's Thesis (Sp, Su, Fa) (1-6)
ECON6233 Microeconomic Theory II (Sp) Advanced treatment of the central microeconomic issues using basic real analysis. Formal discussion of duality, general equilibrium, welfare economics, choice under uncertainty, and game theory.
ECON6243 Macroeconomic Theory II (Fa) Further development of macroeconomic models to include uncertainty and asset pricing theory. Application of macroeconomic models to explain real world situations.
ECON6253 Microeconomics III (FA) This course will develop advanced concepts in information economics and game theory which will then be applied to the design of contracts, insurance, bargaining and auctions. Prerequisites: ECON 5533 and ECON 6233.
ECON636V Special Problems in Economics (Sp, Su, Fa) (1-6) Independent reading and investigation in economics. May be repeated for 6 hours.
ECON643V Seminar in Economic Theory and Research I (Fa) (1-3)
ECON644V Seminar in Economic Theory and Research II (Sp) (1-3)
Independent research and group discussion.
ECON6533 Seminar in Advanced Economics I (IR) This seminar will cover advanced fields of current research importance in economics. This will facilitate the development of research directions for doctoral study and research. Prerequisite: Graduate standing.
ECON6543 Seminar in Advanced Economics II (SP) This seminar will cover advanced fields of current research importance in economics. This will facilitate the development of research directions for doctoral study and research. Prerequisite: Graduate standing.
ECON6623 Econometrics II (Sp) Use of economic theory and statistical methods to estimate economic models. The treatment of measurement error and limited dependent variables and the estimation of multiple equation models and basic panel data models will be covered. Additional frontier techniques may be introduced. Prerequisites: ECON 5613 or AGEC 5613. (Same as AGEC 5623)
ECON6633 Econometrics III (SP) Use of economic theory and statistical methods to estimate economic models. Nonlinear and semiparametric/nonparametric methods, dynamic panel data methods, and time series analysis (both stationary and nonstationary processes) will be covered. Additional frontier techniques may be covered. Prerequisite: ECON 5613.
ECON700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

FINANCE (FINN)

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- J.W. Bellamy Chair of Banking Professor Dominick
- Alice L. Walton Chair in Finance Professor Lee
- Dillard Chair of Corporate Finance Professor Millar
- Harold A. Dulan Finance Chair in Capital Formation and Robert Kennedy Chair in Finance Professor Liu
- Arkansas Bankers' Association Chair in Banking Associate Professor Yeager
- Associate Professors Hearth, Perry
- Assistant Professors Kruse, Jandik, Rennie

Degree Conferred:

Ph.D. in Business Administration (BADM)
(See Business Administration)

Finance (FINN)

FINN410V Special Topics in Finance (Irregular) (1-6) Explore current events, new developments and special topics in Finance not covered in other courses. May be repeated for 6 hours. Prerequisite: FINN 3043. May be repeated for 6 hours.
FINN4133 Advanced Investments (Sp, Fa) Sound training in the principles of security analysis and portfolio management and certain advanced techniques of financial management. Modern portfolio theory and its application to portfolio management practices will be emphasized. Prerequisite: FINN 3063.
FINN4143 Portfolio Management I (Fa) This course applies modern investment theory to the practical management of the Rebsament Trust. Students prepare a statement of investment objectives, recommend an asset allocation strategy based on a quantitative analysis of asset class returns, and select securities using fundamental analysis. Classes are organized as management meetings and visits to investment firms are an important part of the class. Selection is by invitation. Prerequisite: ACCT 3723 and FINN 3063 and by invitation only.
FINN4153 Portfolio Management II (Sp) This course is a continuation of FINN 4143. Topics covered include technical analysis, dynamic asset allocation and derivative strategies. Visits to major investments firms and organized exchanges in New York City or other locations are generally planned. Selection is by invitation. Prerequisite: FINN 4143.
FINN4233 Advanced Corporate Finance (Sp, Su, Fa) Addresses complex and multifaceted issues and problems in financial decision-making. Prerequisite: FINN 3603.
FINN4433 Real Estate Finance (Sp) Consideration of professional aspects of real estate, brokerage, property management, finance, appraisal, property development, current problems and developments relating to real property. Prerequisite: FINN 3933.
FINN5203 Money and Capital Management (Sp, Su) Role of finance in U.S. economy; the institutions, monetary theory, policies which comprise environment in which financial decisions are made. Finance function within firm; financial analysis, planning and control, financial decision making models, financial policies for management. Prerequisite: ACCT 5103 and ECON 5103 and ISYS 5203.
FINN5223 Financial Markets & Valuation (Sp) Analysis of financial information by capital markets in the determination of security values with specific applications to retail and logistics companies. This course views these and other companies from the point of view of the capital markets. May be repeated.
FINN5303 Advanced Corporate Financial Management (Sp, Su) Focus on financial policy issues using real situational cases. Topics include cost of capital, capital budgeting and long-term planning, value-based management, real options, as well as project financing and valuation. Prerequisite: MBAD 5112.
FINN5333 Investment Theory and Management (Fa) Integration of theory, practice of investments with solution of individual and institutional portfolio management problems; Institute of Chartered Financial Analysts' Problems; variable annuity in estate planning. Prerequisite: FINN 5203.
FINN5413 Shollmier Investment Project (Sp) Provide students with the opportunity to design and apply complex investment strategies used in institutional portfolio management on the Shollmier MBA Fund that can involve fixed income and equity securities as well as derivatives. Students will use top down asset allocation models, bottom up security selection, and hedge fund strategies. Prerequisites: FINN 5223 and FINN 5333. May be repeated.
FINN5443 Retail Finance (Fa) The financial success of retail product and service offerings depends on a clear understanding of the socio-economic as well as demographic and environmental factors that drive the changing patterns of consumption. This course introduces the fundamentals and use of consumer and trade area analysis tools, specifically geographic information systems (GIS) and psychographic market analysis, to make informed financial decisions. Extensive case studies are utilized throughout the course to learn concepts and best practices. Prerequisite: FINN 5223 May be repeated.
FINN5623 Investment Banking and Securities Markets (Fa) Topics include investment banking, securities markets, traditional and new financial products, money management, and financial innovation. Prerequisite: FINN 5203.
FINN5633 Financial Institutions (Sp) Savings intermediation and its effects on allocating investments funds; characteristics of financial institutions including services, assets management and growth; relations between growth of institutions and interest rates, consumer behavior, investment demand, government policies, and critical evaluation of performance by financial intermediaries. Prerequisite: FINN 5203.
FINN5703 Multinational Business Finance (Fa) Problems pertinent to managers of firms in multinational business environments, including international institutions, risks, investments and capital budgeting. Prerequisite: FINN 5203.
FINN6043 Finance Theory (Sp, Su, Fa) Provides a conceptual understanding of key theoretical developments in the field of financial economics, including firm decisions under risk within a world of uncertainty.
FINN6133 Seminar in Investment Theory (Sp) Study advanced literature in field investments, with special reference to theory of random walks, stock valuation models, portfolio management.
FINN6233 Seminar in Financial Management (Fa) Financial management of firm with emphasis on financial theory or firm, quantitative methods used in financial analysis, planning.
FINN636V Special Problems in Finance (Irregular) (1-6) Case studies in investments, corporation finance, money and banking, monetary theory, international finance, public finance. By arrangement. May be repeated for 6 hours.
FINN6733 Seminar in Financial Markets and Institutions (Sp, Su, Fa) Recent developments in the literature of financial markets and institutions. Participants will be involved in the extensive study of existing theories and empirical tests of the theories.
FINN700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: candidacy.

INFORMATION SYSTEMS (ISYS)

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- David Glass Chair in Information Systems Professor Davis (F.)
- George M. & Boyce W. Billingsley Chair in Information Systems Professor Venkatesh
- M.D. Matthews Chair in Information Systems Professor Cronan
- Professors Douglas, Jones (T.W.)
- Edwin & Karlee Bradberry Chair Associate Professor Hardgrave
- Associate Professors Aloysius, O'Leary-Kelly (S.), Riemenschneider
- Assistant Professors Armstrong (D.), McKinney, Wilson (D.)
- Visiting Assistant Professor Maruping
- Instructors Armstrong (K), Bristow, McDaniel
- Executives in Residence Davis (C.), Lane (P.)

Degrees Conferred:

M.I.S. in Information Systems (INSY)
Ph.D. in Business Administration (BADM)

Information Systems (ISYS)

ISYS4243 Current Topics in Computer Information (Irregular) (First offered Summer 2002, Formerly CISQ 4243) Intensive investigation of selected developments in computer information systems hardware, software, and organization having current impact on computer information systems design and application. Offering an extension of lower-level CIS courses through individual student research and faculty team-teaching of advanced topics. Topical selection made with each course offering. Prerequisite: WCOB 3016 with a grade of "C" or better. May be repeated for 6 hours.
ISYS4333 Object-Oriented Technologies Seminar (Irregular) (First offered Summer 2002, Formerly CISQ 4333) Provides the student with theory and application of information systems development utilizing object-oriented (OO) technology. Topics include object-oriented analysis, design, data modeling, database management systems, and programming. Prerequisite: ISYS 3293 with a grade of "C" or better.
ISYS4373 Object-Oriented Programming for Business Applications (Sp) (First offered Summer 2002, Formerly CISQ 4373) This course covers object-oriented programming concepts and illustrates them via an appropriate object-oriented programming language. Students will be exposed to the design of software objects, creation of software objects, and the use of objects in constructing an information system. Prerequisite: ISYS 2263 or (CSCE 1023 and CSCE 1021L).
ISYS450V Independent Study (Sp, Fa) (1-3) Permits students on individual basis to explore selected topics in data processing and/or Quantitative Analysis.
ISYS5103 Business Statistics (Sp, Fa) (First offered Summer 2002, Formerly CISQ 5103) Analysis, summarization, and interpretation of data for use in managerial decision making. Includes descriptive statistics, probability and probability distributions, sampling, test of hypotheses, analysis of variance, and regression. Prerequisite: MATH 2043 and MATH 2053 or MATH 2053C.
ISYS5133 E Business Development (Irregular) This course explores various e-business development technologies and then utilizes the technologies for developing a relatively realistic business-to-consumer (B2C) e-business site. Students will also learn about Business to Business (B2B) strategies, market exchanges, XML and XML Web services applications. Simple XML Web services will also be created. Prerequisite: ISYS 3393 or ISYS 4373 or CSCE 1123 with a grade of "C" or better.
ISYS5203 Statistics and Quantitative Analysis (Fa) (First offered Summer 2002, Formerly CISQ 5203) Statistical analysis at intermediate level; lectures and problems develop understanding of statistical methods and provide illustrative situations for applying those methods. Includes analysis of variance and multiple regression. Prerequisite: ISYS 3033.
ISYS5233 Seminar in ERP Development (Sp, Fa) ERP administration and system development practices. Advanced system support issues related to Enterprise Resource Planning systems that are used in global organizations. Basic ABAP programming. In addition, students will learn how to provide basic systems administration support of the operating system, database, and application systems software levels of ERP systems. Prerequisite: WCOB 5213 and ISYS 3293. May be repeated for 6 hours. May be repeated for 6 hours.
ISYS5333 Operations Management (Irregular) Functions and quantitative techniques involved in the operating areas of a business. An enterprise is viewed as an integrated system to demonstrate interrelation of functions and use of feedback, and control; current research and special problems supplement text. Prerequisite: ISYS 5103.

ISYS535V Information Technology Internship Experience (Sp, Su, Fa) (1-3) This course allows a student to experience an internship within a business and benefit from the applied IT experience. The internship must focus on IT applications/problems and be supervised by a faculty member as well as a member of the firm. The course may be taken for 1-3 credits and may be repeated for a total maximum of 3 credit hours. MIS Director approval is required. Pre- or corequisite: MIS Director approval is required. May be repeated for 3 hours.
ISYS5363 Business Analytics (Sp) This course in managerial business analytics provides future managers with the key concepts of decision modeling and information technology management concepts. Students will learn to utilize real time operational business data, as well as quickly process and effectively leverage information. In addition, students will exercise strategic IT deployment skills for supply chain and marketing processes as well as develop strong decision modeling abilities. May be repeated.
ISYS5423 Seminar in Systems Development (Fa) (First offered Summer 2002, Formerly CISQ 5423) Advanced study of structured systems development. Emphasis on strategies and techniques of structured analysis and structured design for producing logical systems specifications and for deriving physical systems designs. Coverage of methodologies for dealing with complexity in the development of information systems. Prerequisite: ISYS 3293.
ISYS5433 Enterprise Systems (Sp) Enterprise Systems comprises the entire class of information technology and systems that support the mission of the company including decision support and business processes. This managerial enterprise systems course focuses on strategic issues of information technology. Students study the various elements and integration of an organization's business processes; as a result, students gain an understanding and working knowledge of systems used to support these business processes and their use in decision making. In addition, students will study concepts and develop skills needed to utilize decision-centric business intelligence and knowledge management applications. May be repeated.
ISYS5453 Introduction to Enterprise Servers (Fa) The focus of this course is to expose students to working with large scale mainframe computer systems. Mainframe computers are the heart of large company's transaction processing systems. This course provides the opportunity for students to gain valuable insight into computing in a mainframe operating environment. Prerequisite: ISYS 2263 or CSCE 1123 with a grade of "C" or better.
ISYS5463 Enterprise Transaction Systems (Sp) Being able to accurately capture and store business transactions is an important processing function in many businesses. For many large companies with high volume processing, the tools of choice for transaction processing are CICS/Cobol/DB2. This course provides sutdents with the necessary understanding and skills to work in this type environment. Prerequisite: ISYS 2263 or CSCE 1123 with a grade of "C" or better.
ISYS5503 Decision Support Systems (Fa) (First offered Summer 2002, Formerly CISQ 5503) An analysis of the highest level of information support which serves the manager-user. A study of systems providing quantitative-based information derived from one or more databases within and/or external to the organization and used to aid upper-level management in the decision making process. The evaluation and application of tools in problem solving and decision making. Prerequisite: ISYS 2263 and ISYS 3333.
ISYS5613 Business Applications of Nonparametric Techniques (Sp) (First offered Summer 2002, Formerly CISQ 5613) Consideration of business and economic research related to sampling and experimental design, testing of hypothesis, and using non-parametric tests. Prerequisite: ISYS 5203 or equivalent.
ISYS5623 Statistical Analysis (Sp) (First offered Summer 2002, Formerly CISQ 5623) Applications of statistical techniques and analysis of business and economic research. For students in business and economics without regard to fields of specialization. Prerequisite: ISYS 5203.
ISYS5713 Seminar in Telecommunications (Fa) (First offered Summer 2002, Formerly CISQ 5713) General telecommunications characteristics and capabilities relative to business applications, networking, electronic commerce, consideration of IT management, security, and ethics. Prerequisite: ISYS 2263.
ISYS5723 Computer Methods in Research (Su) (First offered Summer 2002, Formerly CISQ 5723) Applications of computers to business and industrial research. Numerical problem-solving techniques, statistical computational techniques and packages, and accessing of government and private standard data bases. Prerequisite: ISYS 5623.
ISYS5733 Advanced Business System Modeling (Irregular) (First offered Summer 2002, Formerly CISQ 5733) Analysis and modeling of business systems using simulation techniques. Modeling of business systems using an appropriate simulation language; extensive use of computer. Prerequisite: ISYS 2263.
ISYS5833 Data Management Systems (Sp) (First offered Summer 2002, Formerly CISQ 5833) Investigation and application of advanced database concepts include database administration, database technology, and selection and acquisition of database management systems. Data modeling and system development in a database environment. Prerequisite: ISYS 5423 and ISYS 3293.
ISYS5843 Seminar in Business Intelligence and Knowledge Management (Fa) Business intelligence focuses on assessing and creating information and knowledge from internal and external sources to support business decision making process. In this seminar, data mining and information retrieval techniques will be used to extract useful knowledge from data, which could be used for business intelligence, and knowledge management. Prerequisite: ISYS 5503 and ISYS 5833.
ISYS5933 Global Information Systems Seminar (Su) (First Offered Summer 2002, Formerly CISQ 5933) This course is designed to provide an updated, comprehensive and rigorous treatment of the emerging global IT fields. It summarizes current experiences, offers managerial insights, and incorporates foundational perspectives and examines significant issues from global perspectives. Prerequisite: graduate standing.
ISYS5943 Management of Information Technology Seminar (Sp) (First offered Summer 2002, Formerly CISQ 5943) Presented in a way that allows you to play an active role in the design, use, and management of information technology. Using IT to transform the organization, as competitive strategy, and creating new relationship with other firms is included. Pre- or Corequisite: ISYS 5833. Prerequisite: ISYS 5423.
ISYS6001 Research Seminar in DSS (Irregular) An examination of research topics in decision support systems (DSS). Emphasis on understanding and conducting DSS research. Pre- or Corequisite: ISYS 5503.
ISYS6011 Graduate Colloquium (Sp, Fa) Presentation and critique of research papers and proposals.
ISYS6021 Research Seminar in Systems Development (Irregular) An examination of research topics in system development. Emphasis on understanding and conducting systems development research. Pre- or Corequisite: ISYS 5423.
ISYS6031 Research Seminar in Data Management (Irregular) An examination of research topics in data management. Emphasis on understanding and conducting data management research. Pre- or Corequisite: ISYS 5833.
ISYS6103 Seminar in Management Information Systems (Irregular) Focuses on the relationship between an information system and the organization it supports. Topics include system theory, information system resources, types of information systems, and characteristics of the managerial activities that involve information systems. Prerequisite: ISYS 5723.
ISYS6113 Seminar in Computer Information Systems (Irregular) Provides the student with information in current CIS technological topics. Topics include end-user computing and development, advanced generation languages, artificial intelligence, human factors, small business computing, data center management, distributed data processing and communications, and technology. Prerequisite: ISYS 6103.
ISYS6123 Seminar in Computer Information Systems Research (Irregular) This directed special problems seminar provides a forum to study research in CIS. In addition, students design and develop plans of research in light of current topics and methodology. Research topics in CIS. Prerequisite: ISYS 5423 and ISYS 5503 and ISYS 5833 and ISYS 6113.
ISYS6333 Research Seminar (Sp, Fa) Topical research seminar; emphases on understanding and conducting information systems research. Topics will vary. May be repeated for 18 hours.
ISYS636V Special Problems (Irregular) (1-6) Independent reading and research under supervision of senior staff member. May be repeated for 6 hours.
ISYS700V Doctoral Dissertations (Sp, Su, Fa) (1-18) Prerequisite: candidacy.

MANAGEMENT

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- William R. and Cacilia Howard Chair in Management O'Leary-Kelly (A.),
- Raymond F. Orr Chair in Management Professor Gupta
- Charles C. Fitchner Chair Professor Ganster
- Professors Delery, White (D.D.)
- Cecil & Gwendolyn Cupp Applied Professorship in Entrepreneurship Associate Professor Reeves
- Associate Professors Anand, Ellstrand, Johnson
- Assistant Professors Nag, Rosen

Degree Conferred:

Ph.D. in Business Administration (BADM)
(See Business Administration)

Management (MGMT)

MGMT5203 Managerial Process and Organizational Behavior (Sp, Fa) Acquaints students with administrative and management functions of planning, organizing, directing, and controlling. Special attention given to the impact of human subsystems in organization, organizational designs and structures, and organizational environments.
MGMT5223 Managing & Leading Organizations (Fa) Management for a global environment. The class will cover interpersonal workplace skills such as leadership and motivation, along with the management of human capital through well designed recruitment, selection, performance evaluation, compensation, and quality control systems. May be repeated.
MGMT5313 Strategic Management (Sp) Strategy formulation, strategy implementation, and other topics related to the long-term success of the firm. Includes role of the general manager, international issues, and the impact of management fads on decision making. Prerequisite: MBAD 5212 and MBAD 5222 and MBAD 5232.
MGMT5323 New Venture Development (Fa) Focuses on the identification and analysis of new venture opportunities and how entrepreneurs acquire the human and financial resources needed to develop successful businesses. Topics include market analysis, development of products and services, negotiation, developing and executing business plans, and new venture financing.
MGMT5343 Managerial Communication (Sp, Su, Fa) Communication concepts and theories with emphasis on written and oral skill building. Students apply concepts and skills in a variety of communication contexts.
MGMT5353 Multinational Management (Fa) Problems involved in multinational man-

agement of business firms; emphasis placed on environmental and organizational variables and the application of management concepts as they apply to international situations.
MGMT5363 Innovation & Creativity (Sp) This class will provide a framework for developing, assessing and implementing innovations in start-ups and established businesses. Focus is on creative decision making, managing for innovation, strategic analysis of innovations, and implementation of innovations. Aimed at entrepreneurs, brand managers, and managers in industries where innovation is a key strategic capability.
MGMT5383 Intra/Entrepreneurship of Technology (Sp) A multidisciplinary review of managing the development of new technical products and services in startups and in existing companies. The course includes examination of the search and evaluation for new technical products; development of business plans, resources, and prototypes: and managing the launch and business development of new products.
MGMT5993 Entrepreneurship Practicum (Sp, Su, Fa) Hands-on management of an actual on-going business. Students will gain experience working in, making decisions about, and managing a competitive business. Students will be required to analyze the business in a term paper or other integrative assignment. Entrance by application only.
MGMT6011 Graduate Colloquium (Sp, Fa) Presentation and critique of research papers and proposals. May be repeated for 99 hours.
MGMT6113 Seminar in Organizational Behavior (Irregular) Survey of theoretical and empirical literature in organizational behavior. Stresses critical evaluation of current writing in the field and its integration with prior research. Covers topics relating to motivation, individual differences, job attitudes, social influence processes, and group dynamics. Prerequisite: admission to a Ph.D. program.
MGMT6123 Seminar in Organization Theory (Irregular) This Ph.D.-level seminar presents an overview and introduction into organization theory literature. Emphasis on the development of relevant schools of thought, changes in the content of the traditional or 'mainstream' themes, current topics, schools of thought, and future directions are examined. Prerequisite: admission to a Ph.D. program.
MGMT6133 Seminar in Strategy Research (Irregular) This Ph.D.-level seminar presents an overview and introduction into the strategic management literature. Emphasis on both the content and process of the extant research. Relevant theory, methods, 'mainstream' themes, current topics, schools of thought, and future directions are examined. Prerequisite: admission to a Ph.D. program.
MGMT6213 Seminar in Research Methods (Irregular) Familiarizes students with the principles and techniques underlying research in management and organizations. Issues of basic philosophy of science and research methods are covered. Special attention given to the practical problems of research design, measurement, data collection, sampling, and interpretation in conducting research in management and in organizations. Prerequisite: admission to a Ph.D. program.
MGMT6223 Seminar in Management Topics (Irregular) Seminar in special research topics in management. Topics vary depending upon instructor. Prerequisite: admission to a Ph.D. program. May be repeated for 3 hours.
MGMT6233 Seminar in Human Resource Management (Irregular) Provides an overview of major issues in human resource management. Designed to familiarize students with the seminal research in human resource management, and to provide them with the conceptual and methodological tools necessary to do research in the area. Prerequisite: admission to a Ph.D. program.
MGMT636V Special Problems in Management (Sp, Fa) (1-6) Individual reading and research. May be repeated for 6 hours.
MGMT700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: candidacy.

MARKETING AND LOGISTICS (MKTL)

Thomas D. Jensen
Department Chair
302 Walton College of Business
479-575-4055

Matt Waller
Ph.D. Program Director
347 Walton College of Business
479-575-8741

- Wal-Mart Chair of Marketing Professor Burton
- Wal-Mart Lecturer in Retailing Professor Jensen
- R.A. and Vivian Young Chair of Business Administration Distinguished Professor Kurtz
- Oren Harris Chair of Transportation Professor Ozment
- Professors Creyer, Murray
- Associate Professors Ashton, Gentry, Kopp, Rapert, Stassen, Waller
- Assistant Professors Eroglu, Smith

Degrees Conferred:

M.T.L.M. in Transportation and Logistics Management (TLOG)
Ph.D. in Business Administration (BADM)

Marketing (MKTG)

MKTG5103 Retail Consumer Marketing (Sp) Introduction to marketing concepts and practices as applied to the retail consumer environment. Focuses on the strategic development, positioning, and management of products, promotion, distribution, pricing, and store environments in building customer relationships from retailer and supplier perspectives. (Core) May be repeated.
MKTG5333 Retailing Strategy and Processes (Su) Strategic planning and operation of retailing organizations. Investigation of the various types of retailing with emphasis on both the strategic and functional aspects in retail processes.
MKTG5433 Consumer and Market Research (Fa) Modern marketing research methods and analyses applied to consumers, shoppers, and buyers of goods and services sold in competitive retail environments. Attention is given to both quantitative and qualitative methods, analyses, interpretation, and decision making. Prerequisite: MKTG 5103.
MKTG5533 Strategic Category Management (Su) Strategic planning and management of brands and product categories from both manufacturing and retailing perspectives. Focus is on the product brand development, pricing, distribution, and promotion of brands and their strategic and functional roles in the product mix.
MKTG5543 Category Analysis and Mangement (Sp) Analysis and management of brands and product categories from supplier and retailing strategic perspectives. Focus is on brand and category strategic and functional roles in the merchandising mix as well as their development, pricing, distribution, promotion, and in-store placement May be repeated.
MKTG5553 Shopper, Buyer, and Consumer Behavior (Fa) Behavioral and social science concepts applied to retail shoppers, buyers, and consumers of products and services. Attention is given to research on the cognitive, affective, and experiential aspects involved in the acquisition, consumption, and disposal of products and services by individuals and households. Prerequisite: MKTG 5103.
MKTG636V Special Problems in Marketing (Irregular) (1-6) Individual research problems. May be repeated for 6 hours.
MKTG6413 Special Topics in Marketing (Irregular) Seminar in special topics in marketing. Topics vary depending upon the instructor. May be repeated for 3 hours.
MKTG6423 Seminar in Causal Marketing (Irregular)
MKTG6433 Seminar in Research Methods (Irregular) Extensive review of literature illustrative of marketing research studies. Focuses upon theoretical foundations of research design, methodology, and analysis as well as interpretation of univariate, bivariate, and multivariate data in marketing theory exploration. May be repeated for 3 hours.
MKTG6443 Seminar in Marketing Theory (Sp) Comprehensive survey and critical review of the history of marketing thought and contemporary schools of thought in marketing discipline. Indepth research, review, synthesis, and a research proposal will be required in a selected topic from the perspectives of advancing marketing theory. Prerequisite: MKTT 5103 and MKTT 5303.
MKTG6453 Seminar in Transportation and Business Logistics (Irregular) Underlying theories and problems related to the development of logistical systems in the U.S. Attention focused on transport economics, the role of government in providing transportation facilities, and managerial issues related to integrating transportation, inventory control, warehousing, customer service levels, and facility location.
MKTG6463 Seminar in Strategic Marketing Management (Irregular) Comprehensive survey of literature of strategic marketing management area. Focuses on critical evaluation of conceptual frameworks, research methodologies, and interdisciplinary integrations. Requires indepth research, synthesis, integration, and conceptualization resulting in a research paper aimed at advancing the field of strategic marketing management. Prerequisite: MKTG 5303.
MKTG700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: candidacy.

Transportation & Logistics (TLOG)

TLOG560V Special Topics in Logistics (Irregular) (1-3) Explores current events, concepts, and new developments in the field of logistics and transportation. Topics are selected by the Marketing and Transportation faculty for each semester the course is offered. May be repeated for 3 hours.
TLOG5633 Retail and Consumer Products Supply Chain Management (Sp) Supply chain management is the integration of key business processes from end user through suppliers. The focus of this course is on the core processes that must be linked throughout the supply chain with an emphasis on logistics processes. Foundational topics in logistics and supply chain management will be covered.
TLOG5643 Transportation Strategies in the Supply Chain (Fa) This course focuses on the setting of objectives and the design of optimal transportation strategy and alternative means of implementing transportation strategies within different types of organizations.
TLOG5653 Global Logistics and Supply Management (Sp) This course examines the planning and management of logistics, but emphasizes supplier selection and development, logistics options, strategic alliances, and performance measurement. Emphasis is placed on the integration of purchasing, materials management, and multi-firm logistics planning. International logistics is also addressed within each of these topics. Prerequisite: TLOG 5633.
TLOG5663 Supply Chain Management (Fa) This course examines the planning and management of supply chain activities including supplier selection and development, demand management, quick response, vendor managed inventory, logistics options, strategic alliances, and performance measurement. Emphasis is placed on the integration of purchasing, materials management, and multi-firm logistics planning.
TLOG5673 Modeling Retail & Consumer Products Logistics (Sp) This is a more quantitative approach to measuring logistics performance, modeling tradeoffs and making decisions. Topics include forecasting, inventory management, network optimization, and transportation routing. Prerequisite: TLOG 5633.

Fees and General Information for 2006-2007

Educational expenses vary according to a student's course of study, personal needs, and place of residence. All fees, charges, and costs quoted in this catalog are subject to change without notice. A survey tool is available for tuition and fee estimation at http://avcf.uark.edu/treaweb/tuition.asp.

Financial obligations to the University must be satisfied by the established deadlines. Payment may be made at the University Cashier's Office in the lobby of Silas H. Hunt Hall by cash, personal check, money order, certified check, or VISA, MasterCard, or Discover credit cards. Payment may also be made via the World Wide Web. Acceptance of payment for fees does not imply academic acceptance to the University.

ESTIMATED NECESSARY EXPENSES PER SEMESTER

Estimates of necessary expenses for one semester of the 2006-2007 academic year for a typical graduate student taking 12 credit hours per semester at the University of Arkansas:

	Graduate Resident
Tuition[1]	$3,239.88 ($269.99/hr)
University Fees (A)	346.20
COLG Fee (B)	113.04
SUBTOTAL	$3,699.12
Room and Board (C)	$3,261.00
TOTAL	$6,960.12

Graduate Non-Resident	
Tuition[1]	$7,664.52 ($638.71/hr)
University Fees (A)	346.20
COLG Fee (B)	113.04
SUBTOTAL	$8.123.76
Room and Board (C)	$3,261.00
TOTAL	$11,384.76

(A) University fees comprise the following:

Health, physical education, and recreation fee.....$39.36
Student Health debt fee 10.20
(Calculated at $ .85/Credit Hour)

and the following student-initiated and student-approved fees:

Student Activity fee 10.56
(Calculated at $ .88/Credit Hour)
Student Health fee 76.80
(Calculated at $6.40/Credit Hour)
Associated Student Government Fee 7.20
(Calculated at $ .60/Credit Hour)
Media fee 8.28
(Calculated at $ .69/Credit Hour)
Arkansas Union fee 34.44
(Calculated at $2.87/Credit Hour)
Fine Art Activity Fee.....3.24
(Calculated at $ .27/Credit Hour)
Technology fee 24.00
(Calculated at $2/Credit Hour)
Transit fee 25.68
(Calculated at $2.14/Credit Hour)
Network Infrastructure and Data Systems Fee 88.20
(Calculated at $7.35/Credit Hour)
Safe Ride Fee 2.64
(Calculated at $ .22/Credit Hour)
Distinguished Lecture Fee 5.40
(Calculated at $ .45/Credit Hour)
Headliner Concert Fee 6.60
(Calculated at $.55/Credit Hour)
Razorback Readership Fee.....3.60
(Calculated at $.30/Credit Hour)

(B) Teaching Equipment and Laboratory Enhancement (COLG) fee. This figure reflects the per credit hour graduate fee for the College of Arts and Sciences. To obtain the per credit hour graduate fee for all colleges, view Estimate My tuition and Fees by going to http://avcf.uark.edu/TREAWeb/tuition.asp?pagestate=Estimate and clicking on the rates schedule for the semester needed.

(C) Room and board average expense while living in a residence hall, double occupancy, with an unlimited meal plan. Actual room and board fees vary from $2,948 to $3,119 per semester.

When paying tuition, room and board, and associated fees, anticipated financial aid for a current semester may be deducted when adequate documentation is provided to the University Cashier's Office in Silas H. Hunt Hall. Adequate documentation includes, but is not limited to, award notices, guarantee notices, scholarship letters, and promissory notes.

Information regarding costs and other aspects of University life may be obtained by calling or writing the Office of Admissions, 200 Hunt Hall, University of Arkansas, Fayetteville, AR 72701. In Arkansas call 1-800-377-8632; from outside of Arkansas call (479) 575-5346.

1 Students enrolled in the Graduate School of Business 5000-level courses are charged differential tuition at $80.99 per credit hour more than standard graduate in-state tuition and $191.61 for students with out-of-state residency.

EXPLANATION OF FEES

Tuition Fees

Students classified as "in-state" for fee payment purposes are assessed tuition fees. Students classified as "out-of-state" for fee payment purposes are assessed additional tuition fees.

Official policies of the University of Arkansas Board of Trustees provide the basis for classifying students as either "in-state" or "out-of-state" for purposes of paying student fees. Board policies relating to residency status for fee payment purposes are included in Appendix A of this catalog. Out-of-state students who question their residency classification are encouraged to contact the Office of Admissions, 200 Silas H. Hunt Hall, for more information about residency classification review procedures.

Academic Year

Graduate students enrolling in 12 hours are assessed tuition fees of $3,239.88 each semester. Students with out-of-state residency status are assessed additional tuition fees of $4,424.64. Students enrolled in the Graduate School of Business 5000-level courses are charged differential tuition at $80.99 per credit hour more than standard graduate in-state tuition and $191.61 for students with out-of-state residency. Graduate students are charged per hour of enrollment with no maximums.

Summer Sessions

Graduate students are assessed tuition fees of $269.99 per credit hour. Graduate students with out-of-state residency status are assessed additional tuition fees of $368.72 per credit hour. Students enrolled in the Graduate School of Business 5000-level courses are charged differential tuition at $80.99 per credit hour more than standard graduate in-state tuition and $191.61 for students with out-of-state residency. Graduate students are charged per hour of enrollment with no maximums.

Health, Physical Education, and Recreation Fee

This is a Board of Trustees mandated fee supporting various physical education activities including intramural programs. Students are allowed access to gyms, the pool, fitness center, sauna, racquetball courts, and the indoor track.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $3.28 per credit hour.

Student Activity Fee

University Programs

University Programs is funded by the student activity fee. Students are admitted free to numerous programs presented throughout the year, except major, promoted concerts.

During the regular fall, spring, and summer academic semesters, students are assessed $ .88 per credit hour for the student activity fee.

Associated Student Government Fee

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .60 per credit hour. These funds are allocated to registered student organizations.

Student Health Fee

The student health fee covers the cost of office visits by physicians, registered nurses, and other health professionals, medical evaluations, women's health visits, and counseling and psychological service visits. Other services covered by the health fee include health promotion and education and 24-hour emergency care for counseling and psychological needs.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed a $6.40 per credit hour student health fee.

Student Health Debt Fee

The student health debt fee is charged to pay the debt service for the construction of the new Student Health Center.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .85 per credit hour for the student health debt fee.

Media Fee

The University's student publications, specifically the Arkansas Traveler newspaper and the Razorback yearbook, are partially funded by the media fee. Students reserving a copy are provided with a Razorback yearbook.

All Academic Semesters

During the regular fall and spring semesters, students are assessed $ .69 per credit hour.

Arkansas Union Fee

The Arkansas Union fills the role of the community center of the campus. This fee supports the renovation, expansion, and partial operational costs of the Union.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed a fee of $2.87 per credit hour.

Fine Arts Activity Fee

This fee supports cultural events free of charge, or with minimal charge, to students. These events include presentations in music, theater, drama, opera, visual arts, creative writing (poetry and fiction), and public speaking. Most of the events are held on campus or at the Walton Arts Center. The fee makes cultural presentations possible and encourages students to take advantage of activities. Fulbright College allocates the proceeds of the fee to support cultural programming.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .27 per credit hour.

Technology Fee

This fee provides improvements in computer access for students: increasing dial-up ports, network access, lab support, training programs, and improvements in computing facilities.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed a fee of $2 per credit hour.

Transit Fee

The transit fee helps fund the Razorback Bus Transit System, which services the campus and neighboring community year round.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $2.14 per credit hour.

Network Infrastructure and Data Systems Fee

The network infrastructure and data systems fee provides support for the development and operation of the campus network, including electronic equipment, servers with software and cabling. The

network systems serve computer labs, academic and administrative buildings, residence halls, and off-campus access facilities. Data systems will enable Web-based access to the University's information systems for students, faculty, and staff. It also provides support for upgrades and replacement of the student information system.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed a fee of $7.35 per credit hour.

Safe Ride Fee

The Associated Student Government has initiated a fee that generates necessary funds for the Safe Ride Program, which is a safety-oriented program available during the fall and spring semesters. The program provides a free ride home (within Fayetteville city limits) from any Fayetteville location to all UA students 10 p.m. to 2:30 a.m., Thursday through Saturday.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .22 per credit hour for the safe ride fee.

Distinguished Lecture Fee

The Distinguished Lecture fee specifically pays for two speakers, one in the spring semester and one in the fall semester. Speakers represent two groups: 1) Arts and Entertainment Industry and 2) World Leader or Newsmaker. One speaker from each group is invited each year. Speakers are chosen by the Distinguished Lectures Committee, which is represented by students, staff, and faculty. Contact ASG for information on how to become a member of the committee. The lectures or presentations are free to students via the fee.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .45 per credit hour for the distinguished lecture fee.

Razorback Readership Fee

Provides national newspapers such as the New York Times and USA Today, plus local newspapers such as the Arkansas Democrat-Gazette and the Northwest Arkansas Times to campus for students. Students can find the free newspapers in bins, located across campus, that are accessed with a simple swipe of their Student ID card.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .30 per credit hour for the student readership fee.

Headliner Concerts Fee

Provides concerts by notable artist to the University of Arkansas. The fee will allow for two major concerts, free to all U of A students, to be held each academic year.

All Academic Semesters

During the regular fall, spring, and summer academic semesters, students are assessed $ .55 per credit hour for the headliner concert fee.

Teaching Equipment and Laboratory Enhancement Fees (COLG)

These fees provide and maintain state-of-the-art classroom equipment and instructional laboratory equipment. These fees vary, based upon the student's college of enrollment.

During the regular fall, spring, and summer academic semesters, these fees are assessed on a per credit hour basis.

College or School	Per Credit Hour Fee
Agricultural, Food and Life Sciences, Bumpers College of	$ 9.41
Architecture, School of	15.92
Arts and Sciences, Fulbright College of	9.42
Business, Graduate School of	18.76
Education and Health Professions, College of	7.05
Engineering, College of	29.70

SPECIAL COURSE AND PROGRAM FEES

Fifth-year student internship fee (Education majors only)	$65.00/semester
Special Education Practicum (SPED 532V)	25.00

Other Fees

Graduate application for admission fee	40.00
Late payment fee:	
On the fifth day of classes if balance has not been paid	50.00
December 1, May 1, and July 31 for fall, spring, and summer, if payment has not been made	50.00
International student (nonimmigrant) application fee	50.00
International student service fee per semester	57.89
Mandatory international student health insurance per year	1,082.00
Transcript Fee	
Official Copy	5.00
Unofficial Copy	2.00
Graduation Fee for master's or specialist degree	75.00
Graduation Fee for doctoral degree and Ed.D.	
Fall 2006	85.00
Spring/Summer 2007	85.00
Renewal of Graduation Status Fee	5.00
Parking Permit (per vehicle)	
On campus	60.78
Off campus	40.89
Installment Payment Plan Fee	25.00
Returned Check Fee	25.00
I.D. Card fee	
First card	20.00
Each replacement card	18.00
Residence Hall application fee for new students	35.00
Withdrawal from University Fee	45.00

TESTING FEES

All student testing fees will be based upon the actual cost of the test to be administered plus a standard handling charge not to exceed $15.00 to be added to the University's cost for each individual test administered.

FEE ADJUSTMENTS

Academic Year

Students who officially withdraw (dropping ALL classes that have not been completed up to that time) from the University of Arkansas during the regular fall or spring semesters receive a cancellation of fees as follows, less an Administrative Withdrawal fee of $45.00:

100% adjustment of tuition and fees before the first day of the semester
90% adjustment of tuition and fees through the first 10% of days in the semester
80% adjustment of tuition and fees through the second 10% of days in the semester
70% adjustment of tuition and fees through the third 10% of days in the semester
60% adjustment of tuition and fees through the fourth 10% of days in the semester
50% adjustment of tuition and fees through the fifth 10% of days in the semester
40% adjustment of tuition and fees through the sixth 10% of days in the semester

Summer Sessions

Students who officially withdraw from a summer session or who drop classes in the summer receive cancellations of fees as follows:

100% adjustment before the first day of the session
90% adjustment of tuition and fees through the first 10% of days in the session
80% adjustment of tuition and fees through the second 10% of days in the session
70% adjustment of tuition and fees through the third 10% of days in the session
60% adjustment of tuition and fees through the fourth 10% of days in the session
50% adjustment of tuition and fees through the fifth 10% of days in the session
40% adjustment of tuition and fees through the sixth 10% of days in the session

Billing Statements

Students who pre-register for a semester will be mailed an invoice approximately three weeks prior to the first day of classes. Invoices will be mailed to the student's permanent address unless a separate billing address has been filed with the Treasurer's Office.

It is the responsibility of the student to ensure a correct billing address on the Student Information System. The late fee will not be waived because an invoice was not received.

Late Fees

Students who register for the fall 2006 and spring 2007 semesters are required to pay all registration-related fees and housing charges by the posted payment deadline. Students who fail to pay all registration fees and housing charges or execute an installment payment plan by the deadline may be assessed a late payment fee equal to the outstanding balance, not to exceed $50.00.

Any student with an outstanding balance, to include registration-related fees and/or housing charges, by the last payment deadline will be assessed a late payment fee equal to the outstanding balance, not to exceed $50.00.

Disbursement of Refund Checks

Disbursement of refund checks due to overpayments by scholarships, loans, and/or grants will be mailed approximately one week prior to the start of classes. Checks will be mailed to the student's permanent address unless a check address has been established.

Addresses

Students may create a billing address, which will be used specifically for billing statements, and a check address, which will be used specifically for overpayment checks. These addresses may be created in addition to the local and permanent addresses. If a billing or check address is not created, the default address will be the permanent address. The student may change their address on the ISIS Website through Self Service.

FINANCIAL ASSISTANCE

Registration (in-state tuition) fees and Non-Resident Tuition for Graduate Assistants

Registration Fee. Any graduate student appointed to the position of Graduate Assistant whose appointment is equal to or greater than 50 percent may be granted registration fees in addition to the stipend.

Non-Resident Tuition. Any graduate student appointed to the position of Graduate Assistant whose percent appointment is equal to or greater than 25 percent shall, in addition to any stipend, be treated as an in-state student for tuition and fee purposes for the semester that they are on appointment.

Graduate Assistantships

Graduate assistantships are available for qualified students in numerous fields and must be obtained from the department in which the student is majoring or another appropriate unit. Recipients of these appointments are expected to carry a limited program of graduate studies. Graduate students appointed to the position of graduate assistant whose appointment is equal to or greater than 25 percent shall, in addition to any stipend, be classified as an in-state student for tuition and fee purposes only. In addition, in-state registration (tuition) fees may be paid for appointees of 50 percent or more although tuition is normally not paid for audited courses. Successful applicants must have good academic records, adequate preparation for graduate study in their major field, regular admission to the Graduate School, and must maintain a cumulative grade-point average of at least 2.85 on all work taken for graduate credit. See probation policy below.

Graduate students on 50 percent appointment must be enrolled in a minimum of six hours of graduate credit during the academic year and a minimum of three hours during the summer. For the full policy, see the Graduate School Handbook, available on the Graduate School Web site at http://www.uark.edu/depts/gradinfo.

Dual-enrolled students are not eligible to hold graduate assistantships except by approval of the Graduate Dean, and a student must be within six hours of receiving the baccalaureate degree to be considered.

Application forms may be obtained from the Dean of the Graduate School or from the head or chair of the department in which the student seeks to do his/her major work.

Information on other financial aid (loans and employment) can be obtained at the Office of Scholarships and Financial Aid in Hunt Hall.

Graduate School Fellowships

Exceptionally promising new entrants to doctoral programs may be nominated at the time of application for University Doctoral Fellowships. These Fellowships are awarded competitively, and the stipend may be held in addition to a graduate assistantship.

Students on academic probation who have been in residence at UA Fayetteville for two or more semesters will not be allowed to receive a doctoral fellowship.

The Benjamin Franklin Lever Fellowship is designed to provide financial assistance to graduate students from under-represented groups and to provide a means by which the University can achieve greater diversity in the student body. To accomplish these purposes, the program grants fellowships to qualified under-represented students who enroll in an on-campus program at the University of

Arkansas, Fayetteville campus. Information about applying for the Lever Fellowship will be distributed to qualified applicants before each semester.

Contact the Graduate School, 119 Ozark Hall, (479) 575-4401, for further information about the University Doctoral and the Benjamin Franklin Lever Fellowships.

Eligibility for Continuing Financial Aid

Graduate students are eligible for continuing financial aid through the Office of Financial Aid (e.g., student loans) if:

1. the student completes, with grades of "C" or better, 67 percent of graduate courses attempted at the University, and
2. the student has not yet completed more than 150 percent of the graduate credits required for his/her degree.

Students wishing to continue receiving financial aid who do not meet these requirements will petition the Student Aid Committee.

Academic Probation Policy for Graduate Students

Whenever a regularly admitted graduate student earns a cumulative grade-point average below 2.85 on graded course work taken in residence for graduate credit, he/she will be warned of the possibility of academic dismissal. When a graduate student has accumulated a minimum of 15 hours of graded course work taken in residence for graduate credit with a cumulative grade-point average below 2.85 and has received at least one warning, he/she will be academically dismissed from the Graduate School. This policy is effective with students entering the Graduate School in Fall 2002, or later. For the policy in effect before this time, contact the Graduate School. Graduate teaching and research assistants and students on Lever, Doctoral, or Chancellor fellowships must maintain a CGPA of at least 2.85 on all course work taken for graduate credit. If a student's CGPA falls below 2.85 on six or more hours of graduate work (one full-time semester), notification will be sent to the students and his/her department. If the CGPA is below 2.85 at the end of the next major semester (fall or spring), the department will not be allowed to appoint the student to an assistantship until such time as his/her CGPA has been raised to the required level.

Veteran Benefits

The University of Arkansas is approved by the Arkansas Department of Education for veterans and veterans' beneficiaries who are working toward a degree. Veterans of recent military service, service members, members of reserve units, and the dependents of certain other servicemen may be entitled to educational assistance payments under the following programs: Title 38, Chapter 30, Montgomery GI Bill for Veterans; Title 38, Chapter 32, Veterans Educational Assistance Program (VEAP); Title 38, Chapter 35, Survivors and Dependents Education; and Title 10, Chapter 106, Montgomery GI Bill for Selective Reserves.

All students must be working toward a degree and should follow the curriculum outline for their objectives since only specific courses may be applied toward VA certification and graduation. Persons eligible for educational benefits should contact the Office of the Registrar for information.

WAIVER OF TUITION AND FEES FOR SENIOR CITIZENS

Students who are 60 years of age or older and show proper proof of age may have tuition and fees waived. This waiver is limited to credit courses. Admission and enrollment under these conditions is open only on a "space available" basis in existing classes. Enrollment during Priority Registration periods is not allowed.

ROOM AND BOARD

University Housing (Rates are subject to change)

Housing for married students, students with family status, non-traditional, graduate, and law students is limited and requires early application. Carlson Terrace two-bedroom unfurnished units with utilities paid cost $2,137.50 per semester.

Summer rates for room and board in University residence halls with unlimited meal plans for 2007 summer sessions are $24.07 per day for single-occupancy rooms. Charges start on the requested move-in day and run through the date of check-out. Contact University Housing for information on meal plans (479) 575-3951.

Specific questions concerning on-campus living may be directed to Residence Life and Dining Services (479) 575-3951. Specific questions concerning sorority and fraternity living may be directed to the Office of Greek Affairs (479) 575-4001.

Off-Campus Housing

Students eligible to live off campus may contact local real estate offices for rental information and availability.

OTHER GENERAL FEE INFORMATION

Checks tendered to the University are deposited immediately. The University does not accept postdated checks. Checks returned for "insufficient funds" (NSF checks) are generally presented for payment only once. Each check returned by a bank for any reason will be assessed a returned check fee. The University may, at its discretion, verify available bank funds for any checks written for payment of indebtedness before accepting a check.

The University of Arkansas reserves the right to withhold transcripts or priority registration privileges, to refuse registration, and to withhold diplomas for students or former students who have not fulfilled their financial obligations to the University. These services may also be denied students or former students who fail to comply with the rules governing the audit of student organization accounts or to return property entrusted to them.

Requests for exceptions to University's fees, charges, and refund policies must be made in writing. Instructions for submitting requests for exceptions to the various fees, charges, and refund policies of the University may be obtained as follows:

- For residence life and dining services fees, charges, and refund policies
  contact Residence Life and Dining, Attention: Assistant Director for Business, 900 Hotz Hall.
- For parking services fees, charges, and refund policies contact: Parking and Transit,
  Administrative Services Building, 155 Razorback Road.
- For all other fees, charges, and refunds, contact the Treasurer's Office at
  215 Administration Building, Attention: Treasurer.

Students receiving financial aid are strongly encouraged to have sufficient personal funds available to purchase books and to meet necessary expenses for at least one month at the start of school as some aid funds may not be available for disbursement.

Students are allowed to have automobiles at the University, although parking is quite limited. There is a parking permit and registration fee for each vehicle, varying in cost depending upon the parking option selected.

Academic Facilities and Resources

UNIVERSITY LIBRARIES

The library system of the University of Arkansas, Fayetteville, is composed of the David W. Mullins Library (the main research facility on campus) and three branch libraries: the Robert A. and Vivian Young Law Library, the Fine Arts Library, and the Chemistry and Physics Libraries, which are housed together temporarily during renovations of the chemistry building. The combined holdings of the libraries total more than 1.7 million volumes of books and bound periodicals and over five million items in microform. The Libraries currently receive more than 18,000 separate journal and serial publications. Other resources in the collections include more than 20,000 audio and visual materials, and several thousand maps, electronic databases (indexes and full text), and manuscripts.

The University Libraries maintain membership in the Greater Western Library Alliance, the Center for Research Libraries, the Coalition for Networked Information, Amigos Library Services, and the state consortium ARKLink. Through OCLC, the libraries share cataloging and interlibrary loan information with thousands of libraries all over the world. The University Libraries' holdings are cataloged in the InfoLinks system. Currently enrolled students, faculty and staff can access more than 200 reference databases, thousands of electronic journals, and InfoLinks from any computer with an Internet connection via the Libraries' Web page, available through the University home page or directly at http://libinfo.uark.edu.

The public may use materials, services and resources of the University Libraries on-site. Currently enrolled students, appointed faculty and staff, and approved borrowers with a valid University ID card may check out materials through the libraries' convenient electronic checkout system. The "view your own record" feature of this system allows patrons to check their library records, including the status of checked out items. Materials may be renewed and requested for hold through the automated system. Loan periods vary according to the type of material and circulation policies of the department or branch library, which can be found at the main Access Services Desk or through the library home page. Items not owned by the University Libraries may be obtained through interlibrary loan by completing the online registration and request forms. Requested items in electronic format will be sent directly to desktops; physical items will be held for pick-up at the Access Services Desk.

The Reference Department assists users in locating and using library resources. Reference librarians are ready to help students navigate InfoLinks and the numerous electronic databases. In addition, librarians offer orientation sessions and lectures on research methods to classes and groups upon request, and research consultations to individuals by appointment.

The University Libraries have had official United States government depository status since 1907. The Federal Depository Library Program provides free public access to U.S. government information by distributing information products from Federal agencies to depository libraries throughout the nation. Titles are distributed in paper, microfiche, or electronic formats (Internet, CD-ROM, DVD) and are arranged according to the Superintendent of Documents classification numbering system (SuDoc). The Government Documents Department has also been a depository for Arkansas state publications since 1993. The Department manages the University Libraries' maps collection and GIS (Geographic Information Systems) program, including a public GIS workstation equipped with ArcGIS Desktop Suite.

The Libraries' Special Collections Department acquires and preserves material for research in the history, literature and culture of Arkansas and surrounding regions. Researchers have access to a rich assortment of books, pamphlets, periodicals, photographs, maps and original manuscript collections to support their work.

For information concerning collections and services, as well as information on reserve reading policies, computer laptop loans for in-house use, and group study rooms, please inquire at (479) 575-4104. For inquiries regarding seminar rooms, gifts and donations, or any other library matter, please contact the Dean's Office at (479) 575-6702.

QUALITY WRITING CENTER

The Quality Writing Center, established in 1984, provides an array of services to the University of Arkansas community. The center's primary focus is one-on-one tutorials with students, faculty, and staff who want to improve their writing in projects such as freshman essays, technical reports, research papers, theses and dissertations, or articles for publication. In addition to face-to-face tutorials, consultants offer online tutorials at http://www.uark.edu/write/.

QWC faculty and graduate tutors work with writers on various matters, including brainstorming, organization, transitions, style formats, revision and editing strategies, usage, grammar, and punctuation. During these sessions, consultants ask and answer questions, give reader responses, and help writers take charge of their writing.

The center also assists faculty in planning and evaluating writing assignments and provides clients with assignments, models, articles, and books for them to consult. In addition, center faculty collaborate with classroom faculty in workshops on writing. Besides working with faculty and the general student body, the center also helps students for whom English is a second language (ESL); books and handouts are available to review standard English, and the consul-

tants explain the subtleties of writing assignments to the clients. The center also provides help to non-traditional students who may need to review writing and grammar skills and who may need personalized help to regain confidence in writing. For students writing editorials, petitions, resumes, job applications, or essays for scholarships and medical or graduate schools, the center offers tutorials and provides resource books.

To assist in the writing process, the center has a computer lab where writers may research the Internet, access library resources, write, and easily revise their work after tutorials. Patrons may visit our centers in Kimpel Hall and in the Enhanced Learning Center or access our online services and writing resources at http://www.uark.edu/write/.

COMPUTING FACILITIES AND RESOURCES

The department of Computing Services supports research, academic and administrative computing activity on the UA campus. Computer operations are maintained to provide access to computing facilities and resources 24 hours a day, seven days a week.

A variety of host systems and servers are available for academic use. The primary mail and messaging server on campus is mail.uark.edu. E-mail is browser-based and can be checked from any computer with an Internet connection by going to http://mail.uark.edu/. In addition, users can choose to use e-mail clients such as Outlook or Eudora, both of which are supported. The primary server for academic and research computing is comp.uark.edu, a Sun Enterprise 6500, using the Unix operating system Solaris. Comp supports statistical packages (SAS, SPSS, MATLAB), programming languages (C, C++, FORTRAN, Pascal), e-mail software (Pine), and other Internet applications. Personal home pages may also be developed on the comp server. All students are automatically assigned accounts on mail.uark.edu and comp.uark.edu, and Active Directory, which allows students, staff, and faculty access to computers in the General Access Computing Labs.

A variety of other servers provide support for both administrative and academic computing. These include an IBM 9672 Model RB5 mainframe for administrative computing for campus student information, human resources, and business processing systems; data warehousing; Web services; and file and print services, among others. Some departments participate in Computing Services' Intel-based file services, allowing them access to PC- and Mac-based software through these servers. Additionally, the General Access Computer Labs maintain software via networked servers, allowing access to the same products in multiple labs. Faculty may also access the administrative computing systems for advising purposes, roster generation, and grade reporting. Host peripherals include disk storage, tape systems, and laser printing.

UARKnet, the campus backbone network, is managed by Computing Services. This network enables communication among networks, computers, and servers on campus, as well as on the Internet and Internet2, of which the University is a member site. Virtually all departments, as well as all laboratories, are connected to the campus network. Network access is also available via dial-up modem connections. Dial-up access requires an ID and password, and students have access to a "student only" pool.

The General Access Computer Labs offer approximately 300 network-attached PC and Mac computers for use by University students, faculty, and staff. These labs are located in the Arkansas Union, Administrative Services Building, Sam Walton College of Business Building, Mullins Library, and the Enhanced Learning Center located in Gregson Hall. The labs offer day, evening, and weekend hours. In addition to being Internet-connected, a variety of products are installed on these machines, including Internet browsers (Netscape and Internet Explorer), word processors (MS Word and WordPerfect), databases (MS Access), and spreadsheet programs (MS Excel). Laser printing is available from all supported software. Scanning facilities are available in the Administrative Services Building and the Arkansas Union labs, and color printing is available in the Union. Laptops are available for check-out in Mullins Library and at the Student Technology Center, located in the Arkansas Union. These laptops can be used standalone or with network access via the wireless network in Mullins and the Union. Personal laptops may also connect to the network through public drops located in Mullins and the Union, as well as through the campus wireless network.

Computing Services offers free, non-credit training courses every month on a variety of computer and Internet-based topics, including operating systems, e-mail, word processing, Web page development, presentation tools, and many others. Students can also ask any technology-related question and receive help by going online to askit.uark.edu, the University's new warehouse of searchable IT information for all students, faculty and staff.

The Student Technology Center, provided by the Student Technology Fee and Computing Services, is a walk-in computing help center offering laptops and projectors for checkout, as well as high-end multimedia direction and assistance. Laptops are configured for wireless Internet access, and carrels are available with desktop computers. Laptops and desktops are loaded with advanced, multimedia software for layout, graphics design, and Web site development, which students can learn to use with assistance from staff at the STC.

The MultiMedia Resource Center (MMRC) provides access to and training for computers and applications that can be used to develop programs and classroom presentations. In addition, the MMRC features a training lab, including Internet-connected computers equipped for video conferencing and distance education applications. The MMRC also has presentation equipment and a portable IP-based video conferencing unit available for checkout. The Research Data Center provides researchers with assistance in data design and analysis and with support for other needs, such as training and access to numeric data and assistance in using Web-based data.

Computing Services is located in the Administrative Services Building (ADSB) at 155 Razorback Road. Computing Services specialists offer assistance with operating systems, application programs, virus scanning, modem communications, Internet tools, research projects, general troubleshooting, and more. For more information, call the Computing Services Help Desk at 479-575-2905, from 7 a.m. to 6 p.m. Monday-Thursday and until 5 p.m. Friday, or visit the Computing Services Web site at http://compserv.uark.edu/.

TESTING SERVICES

Testing Services is charged with the responsibility of administering standardized academic tests at the University of Arkansas. The office administers such national tests as the Medical College Admission Test (MCAT), the ACT Assessment, the Law School Admission Test (LSAT), the Graduate Management Admission Test (GMAT), the Graduate Record Examination (GRE), and CLEP exams in addition to others throughout the year. National testing companies determine testing dates and deadlines. Testing Services also offers a number of institutional tests such as the Test of English as a Foreign Language (TOEFL), the Spoken Language Proficiency Test (SLPT), and the Math Placement Test. These tests are scheduled at various times as demand dictates. Test fees vary depending on the test.

To obtain a registration bulletin or information about exam dates and deadlines, please stop by 714 Hotz Hall, call 479-575-3948, or visit the Testing Services Web site at http://www.uark.edu/ua/testing/..

University Centers & Research Units

Research programs are the means by which the University contributes to the generation as well as to the preservation and dissemination of knowledge. With nationally recognized programs in many areas and funding from government, industry, and other private sources, the research effort of the University is strong and diversified and provides special learning opportunities for students as discoveries are made.

In addition to the extensive work performed by faculty through individual and team efforts in academic departments, special programs of research are conducted by the University divisions described below.

AGRICULTURAL EXPERIMENT STATION

http://www.uark.edu/admin/aes/

The Arkansas Agricultural Experiment Station, a statewide unit of the UA Division of Agriculture, conducts scientific research on the dynamic biological, environmental, economic, and social systems involved in the production, processing, marketing, and utilization of food and fiber, community development, and family studies.

The experiment station is one of the most comprehensive research organizations in Arkansas, with a faculty of approximately 200 doctoral-level scientists. It is an essential part of the research and technology infrastructure that supports Arkansas agriculture and the food and fiber sector.

Experiment station research is conducted in agricultural and environmental sciences, marketing and economics, social issues affecting families and rural communities, nutrition, microbiology, genetics, molecular biology, and other dynamic scientific disciplines.

Many experiment station scientists also are on the teaching faculty of the Dale Bumpers College of Agricultural, Food and Life Sciences. The result is a wealth of opportunity for students to study and work with some of the nation's most respected scientists. Graduate students work on master's thesis and doctoral dissertation research projects as part of a team of experiment station scientists in modern laboratories, greenhouses, and field research facilities.

Experiment station research is closely coordinated with the Arkansas Cooperative Extension Service. Together, they comprise the statewide UA Division of Agriculture.

The vice president for agriculture heads the division of agriculture for the UA system. The associate vice president – extension provides leadership to the cooperative extension service and reports directly to the vice president for agriculture. The dean of the Dale Bumpers College of Agricultural, Food and Life Sciences also serves as the associate vice president – research and provides leadership for the agricultural experiment station. The associate vice president – research reports directly to the vice president for agriculture for agricultural research programs and as the dean to the vice chancellor for academic affairs for instructional programs. The associate director of the experiment station also serves as an associate dean in the college, and the associate dean serves as an associate director in the experiment station, respectively.

The mission of the Division of Agriculture, through the combined efforts of the Experiment Station and Extension Service, is to provide new knowledge to strengthen the state's food and fiber sector; assure a safe food supply; conserve natural resources and protect the environment; and assist in the economic and social development of communities, families, and individuals, particularly in the rural areas of the state.

ARKANSAS ARCHEOLOGICAL SURVEY

http://www.uark.edu/campus-resources/archinfo/

The Arkansas Archeological Survey is a research and public service organization charged by the legislature with statewide responsibility for conserving and investigating the state's archeological heritage and with making information on this rich heritage available to all. To this end it has an extensive publication and public relations program. With a staff of 40 (approximately half of whom are professional archeologists), it is recognized as one of the most effective state-supported archeological research organizations in the country. The survey's coordinating office on the Fayetteville campus consists of the director, the state archeologist, computer services, editorial, graphics, and other support staff. There are also several research archeologists who carry out archeological investigations under contracts as required by law to protect the state's archeological resources. There are station archeologists at all 10 research stations around the state, including the Fayetteville campus, who are available for graduate guidance. The survey works closely with the University's Department of Anthropology in training students, cooperates with the state historic preservation officer and other state and federal agencies, and trains and assists citizen groups interested in archeological conservation.

ARKANSAS CENTER FOR ORAL AND VISUAL HISTORY

http://www.uark.edu./misc/arovhist/main/

The mission of the Arkansas Center for Oral and Visual History is to document Arkansas' rich history by collecting the "living memories" of those who have been witness to various aspects of the state's past. Using traditional oral history methodology, the center interviews individuals, transcribes those interviews, and deposits them with the Special Collection's Division of the University of Arkansas Mullins Library. The center is responsible for preserving

these memories and making them available to scholars and researchers interested in the culture and heritage of Arkansas. The center is located in 416 Old Main, Department of History, University of Arkansas, Fayetteville, AR 72701; to contact the center, e-mail jwhayne@uark.edu, call 479-575-5895, or visit the Web site.

ARKANSAS COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

http://biology.uark.edu/Coop/home/coophome.htm/

The Coop Unit is a cooperative venture among the U.S. Geological Survey, Arkansas Game and Fish Commission, the University of Arkansas Department of Biological Sciences, and the Wildlife Management Institute. The Arkansas Coop Unit was established in 1988 and is part of a network of cooperative fish and wildlife research units that exist in 43 state and land-grant colleges across the United States. The purpose of the Coop Unit program is to conduct applied and basic wildlife and fish research, to train graduate students in research and management methods, and to participate in graduate education and technical assistance. The three unit leaders are federal employees stationed on the University of Arkansas campus.

ARKANSAS HOUSEHOLD RESEARCH PANEL

The Arkansas Household Research Panel (AHRP) is a continuing project of the Department of Marketing and Logistics. AHRP consists of several hundred Arkansas households that respond to quarterly questionnaires. The AHRP has been used for academic, student, and business-related research. The panel's funding comes from the professional fees that are generated.

ARKANSAS LEADERSHIP ACADEMY

http://www.uark.edu/~alsa/

The Arkansas Leadership Academy in the College of Education and Health Professions is a model program that prepares leaders for the classroom and the board room, develops accountability to communities, and facilitates the creation of results-driven educational environments. The academy supports reform of the educational system and provides direct services to school districts through district support activities or strategic leadership institutes. Academy graduates become part of a statewide network that pursues educational reform. The network includes representatives from business, industry, state government, the public schools, and higher education. The academy is governed by partners from higher education institutions, education service cooperatives, professional education organizations, state education agencies, foundations and corporations. The synergy created among the partners builds the expertise and capacity for Arkansas to become a true community of learners.

ARKANSAS CENTER FOR SPACE AND PLANETARY SCIENCES

http://www.uark.edu/csaps/

The Arkansas Center for Space and Planetary Sciences links faculty and students in a number of academic departments and various colleges at the University of Arkansas which share common research interests in space and the planetary sciences and require similar facilities for research. The founding departments are chemistry/biochemistry, biological sciences, geosciences, and mechanical engineering.

The center provides research grants and assistantships, hosts seminars and lectures, and has an advisory committee comprised of a variety of professionals in space and planetary sciences. Graduates from the center will be able to enter a variety of career paths in research, teaching, and industry, while many others will assume careers with one of the national space programs.

In addition to following the normal admission procedures in their academic departments, students also will be required to submit a form to the center faculty describing specific interests in space research. The form will be used only to determine if the student is eligible to become affiliated with the center and receive support from the center.

There are no additional academic requirements for the program beyond those of the department, but center faculty should be well represented on the student's advisory committee.

ARKANSAS WATER RESOURCES CENTER

http://www.uark.edu/depts/awrc/

The Arkansas Water Resources Center, established by Public Law in 1964, utilizes scientific personnel and facilities of all campuses of the University (and other Arkansas colleges and universities) in maintaining a water resources research program. The center supports specific research projects throughout Arkansas, which often provide research training opportunities for undergraduate and graduate students, and it disseminates information on water resources via publications and conferences. The center works closely with federal, state, municipal, educational, and other public groups concerned with water resources in development of its research, training, and dissemination programs.

BESSIE BOEHM MOORE CENTER FOR ECONOMIC EDUCATION

http://ceed.uark.edu/home/default.htm

The Bessie Boehm Moore Center for Economic Education, established in 1978 and located in the Walton College of Business, promotes an understanding of the American economy among the people of Arkansas. Its major efforts are directed to elementary and secondary school children. The center's faculty and staff hold workshops and seminars for public school teachers, conduct research in economic education, develop instructional materials, maintain a lending library, and sponsor adult economic educational programs for business, labor, industry, and the general community. In recent years, center personnel have been involved in educating teachers in transitional or developing economies about market economics. The center is officially certified by the Arkansas Council on Economic Education and the National Council on Economic Education.

For college-level students, the center sponsors the Walton College Students In Free Enterprise (SIFE) team. SIFE's mission provides college students the best opportunity to make a difference while developing leadership, teamwork, and communication skills through learning, practicing, and teaching the principles of free enterprise. The Walton College SIFE team welcomes members from other colleges who embrace their mission and want to grow through benefiting the local community. The UA SIFE team is quickly becoming a nationally recognized organization.

The Center is located in Suite 205 of the Don W. Reynolds Center for Enterprise behind the Business Building and may be reached by calling 479-575-2855.

BIOMASS RESEARCH CENTER

The Biomass Research Center currently houses the food safety laboratory, which includes the hybridoma laboratory, the agricultural

research services laboratory, museum curatorial laboratories, and one of the entrepreneurial clients of GENESIS.

CENTER FOR ADVANCED COMPUTING AND COMMUNICATIONS RESEARCH

The Center for Advanced Computing and Communications Research is housed in the Department of Computer Science and Computer Engineering. The Center was established to engage collaborative research in areas that benefit national and international computing and communications industries and Arkansas communities. These include, but are not limited to: algorithms development for information processing and testing, network processors, dependable, secure networks and computing resources, sensor and high performance networks, software and data engineering, cyber security, grid sand cluster computing, DNA computing, agent-based computing, and low-power systems.

CENTER FOR ADVANCED SPATIAL TECHNOLOGIES

http://www.cast.uark.edu/

The Center for Advanced Spatial Technologies (CAST) focuses on application of geospatial technologies in research, teaching, and service. These technologies include GIS, GPS, remote sensing, photogrammetry, geospatial software and systems design, interoperability, and large (multi-terabyte) geospatial databases.

Established in 1991, CAST is a unit of the J. William Fulbright College of Arts and Sciences. CAST has a campus-wide focus, working with the departments of anthropology; architecture; crop, soil, and environmental science; biology; bioengineering; civil engineering; geosciences; entomology; and landscape architecture. Other related partners include the Environmental Dynamics Program, the Arkansas Water Resources Center, Mullins Library, and the Arkansas Archeological Survey.

CAST has been selected as a Center of Excellence by the Intergraph Corporation, Trimble Navigation Inc., the Oracle Corporation, Definiens Imaging, Sun Microsystems, TerraSoft, MapInfo, and PCI Geomatics. These and other corporate sponsors have provided more than $14 million of in-kind support of the research teaching facilities of the center. The center has extensive hardware and software capabilities, including more than 85 high performance workstations, five Windows XP and four Solaris servers (combined seven terabyte of on-line disk), three large-format plotters, multiple scanners, and an extensive inventory of software.

University of Arkansas undergraduate and graduate students have a wide range of geospatial courses available to them that utilize CAST faculties and laboratories. These courses, taken along with related courses in cartography, remote sensing, image interpretation, photogrammetry, surveying, and spatial statistics, provide the student with a range of career options. In addition to classroom instruction, CAST facilities are used by students in both undergraduate and graduate research projects. The internship program in Applied Spatial Information Technologies offers students an opportunity to gain hands-on experience in geospatial technologies.

CAST staff are engaged in research projects in a wide range of areas. A few recent research projects focused on areas such as the creation of a seamless, on-line spatial data warehouse; K-12 GIS education; soil survey by remote sensing; land-use/land-cover identification; remote sensing for historic resources; natural resources wetlands analyses; multi-sensor remote sensing for historic resources; and predicting red oak borer populations.

CENTER FOR ARKANSAS AND REGIONAL STUDIES

http://www.uark.edu/misc/carsinfo/

A multidisciplinary agency within the J. William Fulbright College of Arts and Sciences, the Center for Arkansas and Regional Studies encourages research, publication, and dissemination of knowledge about life and culture in Arkansas and the surrounding region. The center administers the interdisciplinary major in American Studies and sponsors lectures, seminars, conferences, radio programs, and international student exchanges. The center also produces workshops and audio and video documentary recordings, and works with Mullins Library to locate and collect Arkansiana and other regional materials.

CENTER FOR BUSINESS AND ECONOMIC RESEARCH

http://cber.uark.edu/

The Center for Business and Economic Research (CBER) is a public service/outreach center and a student-faculty research center. An integral part of the Sam M. Walton College of Business, CBER conducts externally sponsored research for local and state government, as well as the state business community. The staff responds daily to requests for state and local economic and demographic data.

In addition to conducting externally funded research, CBER maintains several electronic database libraries of economic and financial information to serve the needs of students and faculty. Examples of organizations with which CBER has been involved include the Arkansas Department of Finance and Administration, Arkansas Department of Parks and Tourism, U.S. Army Corps of Engineers, Beverly Enterprises Inc., Mercury Energy, and the Arkansas Research and Technology Park planning group.

CBER publishes the Arkansas Business and Economic Review, a quarterly business and economics journal, which is dedicated to providing information about Arkansas' business and economic environment. The review covers state, regional, and national business and economic issues. It includes state and regional economic indices relating to personal income, industrial output, employment, population, and other factors.

CBER is housed in room 217 of the Donald W. Reynolds Center for Enterprise Development. CBER staff can be reached by phone 479-575-4151, FAX 479-575-7687, or e-mail cberinfo@cavern.uark.edu.

CENTER FOR COMMUNICATION AND MEDIA RESEARCH

The Center for Communication and Media Research (CCMR) advances knowledge and supports scholarly and applied inquiry into the study of interpersonal, group, organizational, and media communication. The center sponsors outreach programs designed to help under-served populations, educational institutions, media companies, businesses, and non-profit organizations.

Multidisciplinary in nature, the center facilitates scholarship among allied disciplines such as journalism, law, business, political science, psychology, sociology, and computer science. Research topics include communication and advertising, dispute resolution, education, environmental concerns, family, health, information technology, legal concerns, life stages, media audiences, organizational concerns, politics, and religion.

For information, contact the Center for Communication and Media Research, Department of Communication, 417 Kimpel Hall, University of Arkansas, Fayetteville, AR 72701, or call 479-575-3046.

CENTER FOR ENGINEERING LOGISTICS AND DISTRIBUTION (CELDi)

http://celdi.ineg.uark.edu/

The Center for Engineering Logistics and Distribution (CELDi) is a multi-university, multi-disciplinary, National Science Foundation sponsored Industry/University Cooperative Research Center located in the Department of Industrial Engineering. CELDi emerged in 2001 from The Logistics Institute (1994) to provide integrated solutions to logistics problems, through research related to modeling, analysis, and intelligent-systems technologies. Research endeavors are driven and sponsored by representatives from a broad range of member organizations, including manufacturing, maintenance, distribution, transportation, information technology, and consulting. Partner universities include the University of Oklahoma, Oklahoma State University, and the University of Louisville. This partnership among academic institutions and industry represents the effective integration of private and public sectors to enhance a U.S. competitive edge in the global market place.

CELDi helps industry partners excel by leveraging their supply chain to achieve a distinguishable, sustainable difference. Member companies realize a measurable return on their investment by creating competitive value chains in terms of cost and service quality. Through basic research, collaborative applied research with industry, technology transfer, and education, CELDi is a catalyst for developing the engineering logistics methodology necessary for logistics value chain optimization.

For more information contact the center at 479-575-2124; FAX 479-575-8431, or visit the Web site.

CENTER FOR HEALTH, PERFORMANCE, AND WELLNESS

The Center for Health, Performance, and Wellness in the College of Education and Health Professions in the Department of Health Science, Kinesiology, Recreation and Dance provides comprehensive educational services as well as research-based programs for the health, optimal performance, and wellness of individuals and/or groups of employees in public and private organizations. The activities of the center are supported through contractual agreements with agencies, hospitals, and schools as well as health and fitness programs. In addition the center provides internships for students in a variety of settings and conducts research on health and wellness issues.

CENTER FOR MANAGEMENT AND EXECUTIVE DEVELOPMENT

http://cmed.uark.edu/

The Center for Management and Executive Development in the Sam M. Walton College of Business provides executive and middle management training opportunities designed to enhance quality in leadership, management decision making, and human resource skills and abilities for corporate and public clients. Programs provide training for implementation of current acceptable practices and approaches to problem solving that support progressive management achievements. Programs are custom designed for individual clients, or they are designed in modular fashion from several pre-prepared programs to meet the general leadership needs of organizations and include such topics as customer service, leadership, team development, total quality and continuous improvement, and personal skills development.

The center serves local, national, and multinational businesses. The center operates on a fee-for-service basis, and its activities are supported from fee based revenues. It also provides directive support for Arkansas manufacturers who seek to produce and market products for the mass market and for its retailers through the Support Arkansas Made program. Support Arkansas Made assists manufacturers in the evaluation of new products and product ideas based upon marketable criteria.

CENTER FOR MATHEMATICS AND SCIENCE EDUCATION (CMASE)

http://www.uark.edu/~k12info

The Center for Mathematics and Science Education (CMASE) – a University of Arkansas K-16 education outreach facility – within the J. William Fulbright College of Arts and Sciences works in conjunction with the Arkansas Department of Higher Education as part of a network of twelve mathematics and science centers on university and college campuses around Arkansas. The main objectives of the center are to 1) provide science, mathematics and technology professional development for K-16 pre-service and in-service teachers; 2) assist in statewide K-16 education initiatives; 3) coordinate regionally beneficial grant-funded programs among universities and colleges for K-16 education; 4) provide science, mathematics and technology educational materials, resources, and information to the K-16 community; and 5) link common K-16 education allies throughout the state.

University Day, Science/Engineering Fairs, Springfest, and various K-16 teacher and student programs are conducted through CMASE. Day-to-day educational outreach information is sent to local, regional, and statewide constituencies through the Center's Web site and various e-mail listservs. CMASE is a host site for the federally sponsored Eisenhower National Clearinghouse and the Southwest Educational Development Laboratory Consortium. CMASE also serves as the Arkansas National Aeronautics and Space Administration (NASA) Educator Resource Center, responsible for warehousing and disseminating NASA materials and providing regular updates on NASA programs and materials to the state.

Web pages specifically designed to provide a wealth of material resources and information available for public, private and home-school educators across the state can be accessed at www.uark.edu/~k12info.

For more information, contact the Center for Mathematics and Science Education at 346 N. West Avenue, No. 202, University of Arkansas, Fayetteville, AR 72701 or call 479-575-3875.

CENTER FOR PROTEIN STRUCTURE AND FUNCTION

http://www.uark.edu/depts/cheminfo/uarkchem/protein/index.html/

The Center for Protein Structure and Function is an interdisciplinary unit for research and teaching within the departments of chemistry/biochemistry and biological sciences in the J. William Fulbright College of Arts and Sciences. The center raises funds from federal, state, and private sources and sponsors faculty- and student-initiated basic research on the folded structures of protein molecules, their dynamic properties, and their diverse functions in biological systems. The center has been awarded funding from the National Science Foundation, the Arkansas Science and Technology Authority, and the National Institutes of Health. Co-directors of the center are Frank Millett and Roger Koeppe in the Department of Chemistry and Biochemistry. For more information, visit the Web site or call 479-575-4601.

CENTER FOR RETAILING EXCELLENCE

http://cre.uark.edu/

The Center for Retailing Excellence in the Sam M. Walton College of Business promotes superior performance in retail practice through both research and education programs. Through its efforts, the center promotes student interest in and preparation for careers in retailing and closely related businesses. The center works to develop strategic alliances between business academics and industry by focusing on interdisciplinary issues and concerns of retailers and vendors in both its activities and research programs. By means of its initiatives and support, the center stimulates research that advances knowledge of retailing and addresses problems faced by retailing organizations and vendor firms. The Center for Retailing Excellence provides a range of benefits for constituent groups comprised of students, retail organizations and their suppliers, and faculty researchers.

CENTER FOR SEMICONDUCTOR PHYSICS IN NANOSTRUCTURES (C-SPIN)

http://www.cspin.net/

The University of Arkansas and University of Oklahoma are equal partners in the Center for Semiconductor Physics in Nanostructures (C-SPIN). C-SPIN is funded by the National Science Foundation under the Materials Research Science and Engineering Center program, with $4.5 million in NSF funding committed to C-SPIN over five years.

C-SPIN personnel include faculty from the physics and chemistry departments. C-SPIN students are enrolled in physics, chemistry, and microelectronic-photonics graduate programs and pursue research ranging from the study of quantum dots grown one atom at a time to colloidal nanocrystals destined to become future detectors of biological processes. In addition to the nanoscience emphasis of C-SPIN, the center also strongly supports K-12 outreach efforts to move the excitement of advanced research into school systems. The efforts of C-SPIN personnel in this area are designed to increase the level of science and technology competency in both Oklahoma and Arkansas. For more information, visit the C-SPIN Web site.

CENTER FOR SENSING TECHNOLOGY AND RESEARCH

http://www.uark.edu/depts/anylchem/cstar/sens.html/

The Center for Sensing Technology and Research (CSTAR), located in the Department of Chemistry and Biochemistry, draws upon unique campus strengths to carry out a high-impact research program directed toward fundamental and applied research in new sensor technology. Through cross-disciplinary interaction of researchers and students, highly effective new sensors are created in a variety of applications. This interdisciplinary collaboration helps to tackle sensor problems, while educating scientists, engineers, and industry about available resources, problems, and new technological solutions. Synergistic interaction with industrial participants provides real world applications in need of advanced sensing technology. By implementing sensor technology within Arkansas-based businesses, CSTAR seeks to improve national competitiveness in science and technology in Arkansas. An essential goal of CSTAR is to contribute to the graduate education of a new generation of scientists and engineers skilled in advanced sensing technology and provide support for recruitment and research of qualified graduate students to the relevant doctoral programs of the participating faculty.

CENTER FOR SOCIAL RESEARCH

http://ww.uark.edu/depts/social/CSR.htm

Since 1982 the Center for Social Research has provided research services to government agencies, communities and businesses. Located in the Department of Sociology, the center can conduct survey and public opinion research, impact assessment, evaluation and policy assessment. The center's staff can provide assistance with research methodology and design, sampling, data collection and analysis.

The center's professional staff has vast experience in virtually every aspect of social research. In addition, the center's resources include computer-assisted telephone interviewing facilities; extensive archival data holdings, including online access to the archival holdings of the Inter-University Consortium for Political and Social Research at the University of Michigan; and, in-house statistical analysis.

For more information, contact Director William Schwab at 479-575-3206.

CENTER FOR THE STUDY OF REPRESENTATION

http://plsc.uark.edu/csr/

The Center for the Study of Representation (CSR) is located in the Department of Political Science in the J. William Fulbright College of Arts and Sciences. The mission of the center consists of scholarship and outreach related to representation. In pursuit of its mission, the center performs two primary functions. First, it promotes original research by faculty and students into various aspects of political representation. Second, the center seeks to foster a wider understanding of the process of representation through its civic education programs. Lectures, symposia, speakers, television and radio appearances, and publications supported by the center contribute to public education and the development of a better-informed citizenry.

The center is more than a set of research projects and outreach programs, however. It is a group of individuals who are devoted to creating an environment that promotes scholarship and interest in representative democracy.

CENTER OF EXCELLENCE FOR POULTRY SCIENCE

http://www.uark.edu/depts/posc/poultry.html

With designation by the University of Arkansas Board of Trustees to make poultry science a center of excellence in the state's university system, the department of poultry science became a reality in 1992.

The Center of Excellence for Poultry Science (CEPS) is comprised of full-time poultry science faculty members, full-time USDA/ARS Poultry Research Group faculty members, graduate assistants, adjunct faculty, and poultry science departmental staff. CEPS receives multidisciplinary contributions from several University departments including animal science; biological and agricultural engineering; biological sciences; crop, soil, and environmental sciences; entomology; food science; industrial engineering; the School of Human and Environmental Sciences; and the UALR College of Pharmacy.

The Department of Poultry Science and the research group are housed in the John W. Tyson Building, which is a 112,000-square-foot, state-of-the-art laboratory and office complex that was completed the fall of 1995 on the UA campus. In addition to the John W. Tyson Building on the main campus, CEPS comprises the following facilities:

- FDA-licensed feed mill;
- 10,000-square-foot processing plant used for teaching processing techniques and for ongoing food safety research projects;
- 12,000-square-foot John Kirkpatrick Skeeles Poultry Health Laboratory, which holds the highest bio-safety rating (P3) available in the country;
- A poultry research farm facility including hatchery, genetics unit, pullet-rearing facility, battery brooder, caged layer house, broiler breeder houses and turkey houses;
- Four full-sized broiler houses equipped with computerized environmental control and data collection systems capable of commercial-type production research; and
- A broiler breeder research facility that includes two full-size broiler breeder houses, a pullet-rearing facility, and quality assurance building with offices, classroom, and egg holding capacity.

By majoring in poultry science, students are provided a scientific as well as a technical education preparing them for positions of leadership and responsibility in the expanding fields of poultry processing, marketing and production, breeding and genetics, nutrition, physiology, poultry health, poultry business management, and food science.

Students in poultry science also may meet all pre-veterinary and pre-medical requirements necessary for entry into those professional areas.

DAVID AND BARBARA PRYOR CENTER FOR ARKANSAS ORAL AND VISUAL HISTORY

http://libinfo.uark.edu/special collections/pryorcenter/

The mission of the Arkansas Center for Oral and Visual History is to document Arkansas' rich history by collecting the "living memories" of those who have been witness to various aspects of the state's past. Using traditional oral history methodology, the center interviews individuals, transcribes those interviews, and deposits them with the Special Collection's Division of the University of Arkansas Mullins Library. The center is responsible for preserving these memories and making them available to scholars and researchers interested in the culture and heritage of Arkansas. The center is located in 416 Old Main, Department of History, University of Arkansas, Fayetteville, AR 72701; to contact the center, e-mail jwhayne@uark.edu, call 479-575-5895, or visit the Web site.

DEPARTMENT OF REHABILITATION, HUMAN RESOURCES, AND COMMUNICATION DISORDERS

http://www.uark.edu/ua/rhrc/

Hot Springs Rehabilitation Continuing Education Center

http://www.rcep6.org/

Established in 1974, this center provides human resource development programming for personnel employed in rehabilitation programs funded by the Rehabilitation Act. These programs include state vocational rehabilitation agencies, independent living centers, community rehabilitation programs, client assistance programs and projects with industries in the states of Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. The center is located in the Hot Springs Rehabilitation Center, Hot Springs, Arkansas.

Little Rock Rehabilitation Research and Training Center for People Who are Deaf or Hard of Hearing

http://www.uark.edu/depts/rehabres/

Established in 1981, this national center conducts research and training programs to enhance rehabilitation efforts on behalf of the 24 million U.S. citizens who are deaf or hard of hearing. These programmatic efforts are directed toward enhancing the career preparation, job entry and placement, career advancement, and workplace communication accommodations consistent with the Americans with Disabilities Act. The center is located in Little Rock and also operates two graduate training programs in deafness rehabilitation at that location.

DIANE D. BLAIR CENTER OF SOUTHERN POLITICS AND SOCIETY

http://www.uark.edu/ua/tshield/blaircenter.htm

The Blair Center, located in the Department of Political Science, is dedicated to fostering political scholarship, public service, civic consciousness, and the study of Southern politics, history and culture. The center supports graduate students studying topics relevant to the South and hosts conferences and periodic speakers discussing issues relevant to Southern politics and society.

ENGINEERING EXPERIMENT STATION

Research is a major function of each of the faculties within the seven departments in the College of Engineering. Research coordination is achieved through the Engineering Experiment Station, which was established for that purpose by an act of the Arkansas Legislature in 1920.

The overall goal of research in the College of Engineering is to provide engineering solutions to important problems that face our society. We utilize our faculty, staff, students, and facilities to enhance the well-being of both public and private sectors. Student involvement in research is especially important in that it helps link them to the needs of their future employers. All departments – biological and agricultural, chemical, civil, computer engineering, electrical, industrial, and mechanical engineering – conduct research over a broad spectrum of subjects that includes areas such as biological and chemical processes; electronics manufacturing; environmental and ecosystems analysis; material and manufacturing; software and telecommunications; and transportation, logistics, and infrastructure. Funding for research within the college comes primarily through grants received from government and industry sources.

ENGINEERING RESEARCH CENTER

http://www.genesis.uark.edu/

The Engineering Research Center provides the facilities and support services for a wide variety of research activities of the College of Engineering. The center houses the Engineering Experiment Station through which the research of individual departments of the college is handled, the Genesis Technology Incubator program, the Southwestern Regional Calibration Center, the High Density Electronics Center, the Arkansas Center for Technology Transfer, the Industrial Training Laboratory, the Center for Interactive Technology, the Systems Technology Laboratory, the Highway Construction Materials Laboratory, the Hydrology Laboratory, the Low-Speed Wind Tunnel Laboratory, and the engineering extension office.

The center is located in a modern 186,000-square-foot facility on 32 acres approximately two miles south of the main campus in Fayetteville.

FAMILY AND COMMUNITY INSTITUTE (THE)

http://www.uark.edu/depts/social/jones_center.htm/

The Family and Community Institute is a joint effort of the University of Arkansas and the Harvey and Bernice Jones Center for Families in Springdale, Arkansas. The institute is a multidisciplinary research center in the J. William Fulbright College of Arts and Sciences that conducts basic and applied research, as well as policy-related studies on the critical issues facing families and communities in the region and the nation. The institute raises funds from federal, state, and private sources and sponsors applied research by faculty and students on the family and the community.

FULBRIGHT INSTITUTE OF INTERNATIONAL RELATIONS

http://www.uark.edu/~fiir/

An interdisciplinary unit within the J. William Fulbright College of Arts and Sciences, the Fulbright Institute of International Relations encourages student and faculty research and scholarly analysis of foreign policy and international affairs. The institute sponsors instructional activities, conferences, seminars, public events, and publications, including a major spring symposium on a significant topic in international affairs. The institute's office of Study Abroad and International Exchange coordinates a number of overseas programs and provides support services for students interested in study abroad.

GARVAN WOODLAND GARDENS

http://www.garvangardens.org/

Garvan Woodland Gardens is the botanical garden of the University of Arkansas, established in 1993 by an endowment from Mrs. Verna C. Garvan. Her vision is the foundation of the Garden's mission to serve the public and provide teaching and research opportunities for the Department of Landscape Architecture and the School of Architecture.

As early as 1985, the Department of Landscape Architecture was utilizing portions of the 210 acres on Lake Hamilton, in Hot Springs, Ark., as a resource to teach local ecology and design principles. Teaching opportunities continue in these areas and currently feature urban forestry, wetland ecology, construction methods and materials, design implementation, and horticulture. Two designed features offer case studies for landscape architecture and architecture students, as well as professionals: the Asiatic Garden, by nationally recognized Asiatic garden designer David Slawson, and the Verna C. Garvan Pavilion, by internationally recognized architects E. Fay Jones and Maurice Jennings.

Research opportunities lie in wetland ecology and constructed wetland design, sustainable design, and therapeutic gardens. Ongoing public programs feature workshops on gardening techniques, bonsai collections, and perennials.

An annual symposium focuses on timely issues affecting the quality of life of people in Arkansas and the nation. Past topics include historic landscape preservation practice in Arkansas and livable and sustainable community development.

Garvan Woodland Garden is a member of the American Association of Botanical Gardens and Arboreta.

GENESIS TECHNOLOGY INCUBATOR

http://www.uark.edu/depts/genesis/index.html

Located in the Engineering Research Center but acting as a resource for the University, GENESIS provides technology-based companies with research and development support by allowing these firms access to University labs and facilities as well as technical support from University researchers. Firms accepted into GENESIS are provided physical space in University research centers as well as office space, shared support services, and both business and technical guidance. GENESIS' goal is that of creating jobs for Arkansans skilled in the science and engineering professions as well as helping to diversify both Arkansas' technology and economic base. Applicants must meet strict technical guidelines as determined by a committee of University researchers, administrators, and a 15-member advisory board comprised of community business leaders. GENESIS was conceived to span all University colleges and departments by providing entrepreneurs needing research and development support a method for obtaining and coordinating the same through a program which focuses the resources of the entire campus for this common objective.

GREAT EXPECTATIONS OF ARKANSAS

http://www.geaonline.org/

Great Expectations of Arkansas, based in the College of Education and Health Professions, prepares teachers and administrators to create classroom change through effective environments in which academic, attitudinal, and behavioral outcomes are attained in keeping with high standards for achievement. Encouraging group work and confidence building, Great Expectations students are involved in classrooms in which they can learn regardless of their background. The mission of Great Expectations is to provide a supportive learning environment based on core beliefs that will allow every student in participating schools to experience high degrees of success. The program delivers specialized institutes and follow-up services for teachers throughout the state.

HEALTH EDUCATION PROJECTS OFFICE

http://www.uark.edu/depts/hepoinfo/hepo.html/

The Health Education Projects Office in the College of Education and Health Professions in the Department of Health Science, Kinesiology, Recreation and Dance serves schools and communities to assist them in the delivery of effective health education programs. In addition to ongoing research in selected health education areas, the office has developed health education programs and interventions to foster effective education of children and youth. In addition, the office provides professional development for teachers and other educators, assists with program implementation, and consults on health education projects. The office has specialized in abstinence education, substance use prevention, tobacco use prevention, rural health education, and HIV/AIDS education.

HIGH DENSITY ELECTRONICS CENTER

http://www.hidec.engr.uark.edu/

The High Density Electronics Center (HiDEC) was established in 1991 as an interdisciplinary research program in advanced electronic packaging technologies, particularly the rapidly developing technology of multichip modules (MCMs), which allow electronic systems to be small, fast, and cheap.

With generous support from the Defense Advanced Research Projects Agency (DARPA), a large clean room was constructed,

and an MCM fabrication facility, unique among universities, was installed. Current research programs focus on 3-D electronic packaging, high density laminate substrates, co-fired ceramic substrates for wireless applications, high temperature superconducting (HTSC) tunable filters, micro electromechanical systems (MEMS), and integrated passives development. The program is located in the Department of Electrical Engineering but involves faculty from six departments and more than 25 graduate students. Continuing funding comes from DARPA and several industrial sponsors. Significant national recognition has resulted from work performed at HiDEC.

HUMAN PERFORMANCE LABORATORY

http://www.uark.edu/admin/hplweb/

The Human Performance Laboratory in the College of Education and Health Professions in the Department of Health Science, Kinesiology, Recreation and Dance has a dual-purpose mission: educational outreach and research programs for targeted populations. The program is committed to the pursuit of knowledge about the health and well-being of people through research, research dissemination, outreach, and service. Known for an emphasis on fitness, the program provides an opportunity for faculty and students to conduct ongoing research and service programs.

INFORMATION TECHNOLOGY RESEARCH INSTITUTE

http://itrc.uark.edu/

The Information Technology Research Institute (ITRI) is an interdisciplinary unit for research within the Sam M. Walton College of Business. The mission of the ITRI is to advance the state of research and practice in the development and use of information technology for enhancing the performance of individuals and organizations; provide a forum for multi-disciplinary work on issues related to information technology; promote student interest in the study of information technology; and facilitate the exchange of information between the academic and business communities. The ITRI was established by a grant from the Walton Family Charitable Support Foundation.

INSTITUTE OF FOOD SCIENCE AND ENGINEERING

http://www.uark.edu/depts/ifse/

The Institute of Food Science and Engineering and its three technology centers grew from the commitment of the University of Arkansas Division of Agriculture to finding creative ways to bring its expertise and resources to bear on specific problems and issues that affect productivity and growth in the food processing industry, with the mission of strengthening that critical component of the agricultural sector and the entire economy.

The institute assists industry by fostering cooperative, multidisciplinary efforts that provide research to solve problems, technology transfer to put new information to work, and education in skills needed by specific industries. Alliances between the institute and private industry devise solutions to identified problems. This demand-driven approach assures a direct, positive impact on the value-added processing of food products.

The Center for Food Processing and Engineering's primary objective is to facilitate research leading to value-added products and improving the efficiency and effectiveness of the processing of agricultural products. Activities of the Center for Food Safety and Quality seek to maintain or improve the safety of foods through production, harvest, processing, distribution, and storage. The main thrust of the Center for Human Nutrition is to develop new value-added functional foods with elevated levels of health-promoting compounds and ways to motivate people to include generous amounts of these foods in their daily diets. These efforts will assure food safety and improve the sensory and nutritional quality of food to meet the nutritional requirements and food preferences of a changing society.

The offices of the Institute of Food Science and Engineering are located in the Food Science Building at the Arkansas Agricultural Research and Extension Center. Visit us on the World Wide Web or by phone, 479-575-4040.

INTERNATIONAL CENTER FOR THE STUDY OF EARLY ASIAN AND MIDDLE EASTERN MUSICS

http://www.uark.edu/ua/eeam/

The International Center for the Study of Early Asian and Middle Eastern Musics, established in 2000, is a research center located in the Department of Music in the J. William Fulbright College of Arts and Sciences.

The center coordinates the international Tang Music Project and is linked with the Ancient Asian Music Preservation Project of the Library of Congress, a partnership that includes internships at the Library as well as an acquisitions program. The center also functions as the base for graduate training in historical ethnomusicology and related fields, specifically tailored toward early documented repertories of ritual- and art-music and present day performance practices in historically significant musical traditions of Asia and the Middle East. The recovery of early Asian musics and the design of music-centered algorithms and their implementation in computer programs are central aspects of the center's research and teaching activities. The center works closely with both the Department of Music and the King Fahd Center for Middle East and Islamic Studies in sponsoring lectures, seminars, concerts, and workshops, and it collaborates in developing international ties to other institutions and in promoting student and performing-artist exchanges. For more information, contact Elizabeth Markham or Rembrandt Wolpert at 479-575-4702.

THE KING FAHD CENTER FOR MIDDLE EAST AND ISLAMIC STUDIES

http://www.uark.edu/depts/mesp/

The King Fahd Center for Middle East and Islamic Studies is an academic and research unit in the J. William Fulbright College of Arts and Sciences. It is an interdisciplinary and interdepartmental area studies center that offers diverse cultural, intellectual, and educational opportunities for the University of Arkansas community. Its functions include the promotion of research and teaching in interdisciplinary Middle East studies and global Islamic studies.

Through the King Fahd Middle East Studies Program (MEST), the center offers an undergraduate major in Middle East Studies and supports graduate studies in Middle East-related departments and programs. Middle East studies majors of superior ability may apply for MEST scholarships to help fund their studies. The center also supports summer language study and research assistantships for graduate students and teaching and research by visiting scholars from affiliated universities and programs.

Through its core faculty, the center coordinates with University departments to offer a full range of Middle East courses, supports faculty research in Middle East and Islamic studies, engages in outreach activities, and supports an ambitious program of visiting speakers and workshops. The King Fahd Center currently maintains relationships with universities in Saudi Arabia, Jordan, Morocco,

Tunisia, and Russia. The center also cooperates with the Aga Khan Humanities Program in Central Asia, the Middle East Institute in Washington, D.C., and the Elijah Center for the Study of Wisdom in World Religions in Jerusalem.

MACK-BLACKWELL NATIONAL RURAL TRANSPORTATION STUDY CENTER

http://www.uark.edu/depts/intagpro/ru_trans.html/, or
http://www.mackblackwell.org/

The Mack-Blackwell National Rural Transportation Study Center (MBTC) was established by a grant from the U.S. Department of Transportation to provide educational opportunities and conduct research in the area of rural transportation. Additional support is received from the Arkansas Highway and Transportation Department. The broad objective of the center is to improve the quality of life in rural areas through transportation. The educational objective is to provide graduates qualified to enter the transportation-related professions with the diversity of backgrounds needed to lead transportation development in the 21st century. Although housed within the Department of Civil Engineering, MBTC's activities are not limited to engineering. All disciplines related to or impacted by transportation participate in MBTC research and educational activities.

NATIONAL AGRICULTURAL LAW CENTER

http://www.NationalAgLawCenter.org/

The National Agricultural Law Center is a federally funded agricultural law research and information center located at the University of Arkansas School of Law. Created in 1987, the center fulfills its mission by conducting and sponsoring objective and authoritative agricultural and food law research and by providing bibliographic and other resources on agricultural and food law.

The center works closely with the UA School of Law Graduate Program in Agricultural Law, an academic program that awards the Master of Laws degree in Agricultural Law. Selected students in the graduate program serve as research fellows at the center during their residency in the graduate program.

The center is the only one of its kind in the United States and has received national recognition. It recently enhanced its national reach by establishing a collaborative relationship with the Agricultural Law Center at Drake University School of Law in Des Moines, Iowa.

Publications and research assistance are available in print and through the Web site.

NATIONAL OFFICE OF RESEARCH, MEASUREMENT, AND EVALUATION SYSTEMS

http://orme.uark.edu/orme/index.html/

The Office of Research, Measurement, and Evaluation, organized in 1998, is a research and service unit in the College of Education and Health Professions in the Department of Educational Leadership, Counseling and Foundations. Its mission includes the analysis and dissemination of data to facilitate school improvement and reform in Arkansas. The faculty and staff of the office offer expertise in the areas of educational statistics, test and measurement theory, research design, standardized assessment, program evaluation, and policy analysis. The mission of the office is to conduct targeted educational research, drawing on the talents of faculty from several disciplines. The research conducted through the office addresses significant issues affecting the educators and students of the public schools of the state.

NORTHWEST ARKANSAS WRITING PROJECT

http://www.uark.edu/depts/coehp/Programs.htm

Established in 1997, the Northwest Arkansas Writing Project is affiliated with the National Writing Project at the University of California, Berkeley. Based in the College of Education and Health Professions in the Department of Curriculum and Instruction, the project involves teachers in workshops and institutes to prepare them to be creative and effective in their classroom writing programs. The project supports collaborative efforts with the public schools to enhance the teaching of writing, extend the uses of writing in the curriculum, and foster the professional development of teachers. Project institutes enable teachers to develop relationships with fellow teachers to create communities of professionals focused on the improvement of writing by students in K-12 schools and at the college level. During the school year, institute graduates attend follow-up sessions, provide workshops in local schools, and serve as resources in their communities. Kidswrite, a companion program for children, provides a summer experience for the exploration of writing and guided practice through the writing of poems, plays, short stories, songs, and newsletters.

OAK RIDGE ASSOCIATED UNIVERSITIES

http://www.orau.org/

Since 1948, students and faculty of the University of Arkansas have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 91 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. Students may participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are specially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found at http://www.orau.gov/orise/educ.htm, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research, and support programs as well as services to chief research officers.

For more information about ORAU and its programs, contact Collis R. Geren, Dean of the Graduate School and Vice Provost for Research, and ORAU Councilor for the University of Arkansas at 479-575-5901; or Monnie E. Champion, ORAU Corporate Secretary, 865-576-3306; or visit the ORAU Web site (http://www.orau.org).

OFFICE FOR STUDIES ON AGING

http://www.uark.edu/misc/aging/

The Office for Studies on Aging in the College of Education and Health Professions was established in August 1999 to coordinate the resources of the University in addressing the needs of the aging population in Arkansas and beyond. The office was developed to be the center for research and study of the physical, social, and psychological aspects of the aging process drawing on a host of disciplines across campus. The office conducts research, provides services, and acts as an interface between the University and the variety of service modalities for the aging population. Initial efforts of the office are directed toward a variety of issues facing older Americans to provide meaningful solutions so that the process of aging is a positive experience, both emotionally and physically.

RFID RESEARCH CENTER

http://itri.uark.edu/rfid/

On February 4, 2005, the Information Technology Research Institute created its first subunit, the RFID Research Center. This new center spans many disciplines including retail, supply chain, industrial engineering, and computer science, among others. The center's base of operations is a lab which models a production warehouse environment in 7000 square feet of space donated to the center by Hanna's Candles and located within Hanna's manufacturing and warehouse facility.

SMALL BUSINESS DEVELOPMENT CENTER

http://sbdc.waltoncollege.uark.edu/

The Small Business Development Center (SBDC), located in the Walton College of Business, provides small business consulting and technical assistance to the business community of Northwest Arkansas. The SBDC serves as the focal point for linking together resources of the federal, state, and local governments with resources of the University, the Sam M. Walton College of Business, and the private sector. These resources are utilized to counsel and train small businesses in resolving organizational, financial, marketing, technical, and other problems they might encounter. The SBDC offers free consulting services to small business clients. Seminars for small businesses are offered on a wide range of topics. Small Business Administration publications, other relevant small business publications, and Internet access are available for small business owners in the SBDC resource center.

SOUTHWEST RADIATION CALIBRATION CENTER

http://www.genesis.uark.edu/

The Southwest Radiation Calibration Center (SRCC) provides services for neutron radiation survey equipment that requires periodic calibration. Since 1983, the SRCC has provided an expanding range of calibration services to a large number of clients around the United States including federal and state agencies, nuclear power stations, universities with research reactors or radiation research programs, oil exploration drilling companies, and nuclear medicine centers.

SRCC Services include NIST-traceable, D 2 O-moderated Californium-252 calibrations of virtually any neutron survey instruments used for radiation protection purposes. The calibrations are offered in two types: Type 1 - Calibration consists of radiation measurements at six points on one decade scale for digital instruments. For analog instruments, this is followed by electronic calibration of the remaining scales via detector sensitivity. Type 2 - Calibrations consist of radiation measurements at two points per scale on 2-4 scales per instrument. This type is mainly for non-autoranging instruments.

In addition, other services include NIST-traceable irradiation of personal neutron radiation monitoring badges or electronic cumulative monitors (chirpers), including TLDs and all other types. Delivered dose equivalents offered are from 50 mrem to 5 rem on a neutron phantom per ANSI N13.11. Stated accuracy is to within ± 5 percent. Full documentation, including calibration certificate and calibration sticker showing correction factor, sources used, optional next calibration date, current calibration date, person(s) calibrating the instrument, and instrument identification.

The Southwest Radiation Calibration Center is located in the UA Engineering Research Center complex.

SPEECH AND HEARING CLINIC

http://www.uark.edu/depts/coehp/SPCL.htm

The Speech and Hearing Clinic in the College of Education and Health Professions in the Department of Rehabilitation, Human Resources, and Communication Disorders provides evaluation, treatment, on-site consultation in schools and homes, and small group therapy services. The clinic offers evaluation and treatment for children and adults in the areas of hearing loss, central auditory processing, articulation, fluency, voice, language, augmentative and alternative communication, swallowing, and spoken English for foreign speakers. These services are provided by graduate students in the program under the direct supervision of audiologists and speech-language pathologists on the program faculty. It continues to expand its reputation as a regional center for services in augmentative communications and assistive technology.

SUPPLY CHAIN MANAGEMENT RESEARCH CENTER

http://scmr.uark.edu/

The Supply Chain Management Research Center (SCMRC) at the UA Sam M. Walton College of Business sponsors and promotes supply chain, logistics, and transportation research and education. Center faculty view the supply chain as the channel that integrates business processes from suppliers through end users, providing value-added products, services, and information. Supply chain management incorporates both inter- and intra-company logistics, transportation, and management systems.

The center undertakes research and training in all aspects of the supply chain. It has sponsored research on VMI, trained salespersons and developed MRP systems, and simulated supply chains for logistics executives. The SCMRC has a broad range of interests and capabilities and has close ties to and cooperative programs within the Walton College (e.g., Center for Retail Excellence, Information Technology Research Center) and with other centers at the U of A (e.g., The Logistics Institute in the UA College of Engineering). The SCMRC is unique in that its capabilities span the technical and managerial arenas of supply chain management.

The SCMRC's Board of Directors includes representatives of firms such as ABF Freight Systems, American Freightways, Colgate-Palmolive, Federal Express, J.B. Hunt Transport, Pillsbury, Sunbeam, Tyson Foods, Unilever HPC, and Wal-Mart. The Board of Directors, along with notable supply chain professionals from business and academia, meet annually to discuss the state of the art in supply chain

management and to provide advice and direction for the center. For additional information about the Supply Chain Management Research Center at the Sam M. Walton College of Business contact the center at 479-575-2536 or FAX 479-575-4173.

SURVEY RESEARCH CENTER

http://www.uark.edu/admin/src/

The Survey Research Center promotes faculty and funded graduate student research and evaluation in fields as varied as agriculture, engineering, arts, social and physical sciences, education, health, and athletics. Information garnered from surveys can also enhance administrative decision-making. The center conducts a variety of types of surveys including, but not limited to, computer-assisted telephone, mail, Web, e-mail, and face-to-face as well as focus groups. The Survey Research Center provides technical consultation and is the University supplier of UA data to graduate students. With University-wide responsibilities, the center reports to the Vice Provost for Research. Services range from consultation on proposals through total research design and implementation, including reporting. Included are survey development, sample design and sampling, data collection, data coding, test entry and verification, analysis, report writing, and presentation of results. Bringing together interdisciplinary teams of researchers for collaborative work is an aim. Students employed in the center receive instruction in survey methods and microcomputer applications. The center operates on a fee-for-service basis.

UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER

http://uacdc.uark.edu

The mission of the University of Arkansas Community Design Center is to advance creative development in Arkansas through education, research, and design solutions that enhance the physical environment. As an outreach center of the School of Architecture, UACDC is developing a repertoire of new design methodologies applicable to community development issues in Arkansas, with currency at the national level. UACDC design solutions introduce a multiple bottom line, integrating social and environmental measures into economic development. Integrative design solutions add long-term value and offer collateral benefits related to sustained economic capacity, enhanced ecologies, and improved public health — the foundations of creative development. UACDC was founded in 1995 and has provided design and planning services to over 30 communities across Arkansas. UACDC planning has helped Arkansas communities to secure nearly $9 million in grant funding to enact suggested improvements.

UNIVERSITY OF ARKANSAS ECONOMIC DEVELOPMENT INSTITUTE

http://uaedi.cast.uark.edu/

The University of Arkansas Economic Development Institute (UAEDI) was established in 2002 to promote individual and community prosperity and well-being in Arkansas by helping extend suitable UA programs throughout the state in partnership with others having similar interests. Composed of University faculty, staff, and students, UAEDI is about preparing people for prosperity.

UAEDI endeavors to create an upward movement of well-being by bolstering the people to a prosperity spiral that sequentially links people, partners, power, programs, proposals, projects, and prosperity in the following manner:

People – by addressing the needs of people for community, business, industrial, educational, and leadership development through comprehensive partnerships.

Partners – by facilitating synergistic partnerships among the University of Arkansas and others including K-12 schools, community colleges, other universities, foundations, civic groups, businesses and industry, elected officials and other leaders, and local, state, federal, and international organizations.

Power – by harnessing the power of UA programs to discover, develop, and deliver knowledge to the state and the world through programmatic expertise in areas related to health, learning, information, environment, technology, management, and culture.

Programs – by utilizing the University's infrastructure, including centers, laboratories, other collaborative efforts and facilities, to develop outstanding programs and proposals.

Proposals – by developing creative, innovative quality proposals that lead to funded projects.

Projects – by successfully executing projects that promote prosperity and well-being in the state through community, business, industrial, educational, and leadership development.

Prosperity – by leveraging resources to further develop the physical and intellectual capital that leads to an upward spiral of economic and social well-being and prosperity for the people of Arkansas.

For more information about the University of Arkansas Economic Development Institute, contact Director, UAEDI, 226 Engineering Hall, University of Arkansas, Fayetteville, AR 72701, 479-575-5118, FAX 479-575-2412; e-mail ojl@uark.edu; or visit the Web site.