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2012-13
GRADUATE
Catalog of Studies



UNIVERSITY OF
ARKANSAS®

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International Admissions, 346 N. Arkansas Ave. 575-6246
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Independent Study
Center for Continuing Education 575-3647
Toll-free.....1-800-638-1217

Deans' Offices

Honors College..... 575-7678
418 Administration Building
Dale Bumpers College of Agricultural, Food and Life Sciences
E-108 Agricultural, Food and Life Sciences Bldg..... 575-2252
Fay Jones School of Architecture
112 W. Center St., Suite 700 575-4945
J. William Fulbright College of Arts & Sciences
525 Old Main 575-4801
Sam M. Walton College of Business
301 Business Building..... 575-5949
College of Education and Health Professions
324 Graduate Education Bldg. 575-3208
College of Engineering
4183 Bell Engineering Center 575-3051
Graduate School and International Education
346 N. Arkansas Avenue (Stone House North) 575-4401
School of Law
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Vice Provost of Enrollment and Dean of Admissions
232 Silas H. Hunt Hall..... 575-3771

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Arkansas Union Room 213 575-5651

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Office of Financial Aid
114 Silas H. Hunt Hall..... 575-3806
Academic Scholarship Office
101 Old Main 575-4464

Greek Life

Arkansas Union A687 575-5001

Honors Programs

Honors College..... 575-7678
ADMN 418
Dale Bumpers College of Agricultural, Food and Life Sciences
Dean's Office AFLS E-108 575-2252
Fay Jones School of Architecture
112 W. Center St., Suite 700 575-4945
J. William Fulbright College of Arts & Sciences
517 Old Main 575-2509

Sam M. Walton College of Business
WCOB 328..... 575-4622
College of Education and Health Professions
Office of the Associate Dean, GRAD 317 575-4205
College of Engineering
BELL 3189..... 575-5412

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International Admissions, 346 N. Arkansas Ave. 575-6246
(Stone House North)
International Students and Scholars, 104 Holcombe Hall... 575-5003

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Admissions, 232 Silas H. Hunt Hall..... 575-4200

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Office of the Registrar, 146 Silas H. Hunt Hall..... 575-5451

ROTC

Air Force ROTC, 319 Memorial Hall..... 575-3651
Army ROTC, 207 Military Science Building..... 575-4251

Student Affairs

Vice Provost for Student Affairs and Dean of Students
325 Administration Building..... 575-5007

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Testing Services, 1435 W. Walton..... 575-3948

Toll-Free Number 1-800-377-8632

The following offices may be reached by dialing this toll-free number between 8 a.m. and 4:30 p.m. each weekday:

Office of Admissions (undergraduate)
Office of Scholarships and Financial Aid
New Student Orientation

Transcripts, Academic Records

Office of the Registrar
146 Silas H. Hunt Hall..... 575-5451

University Switchboard 575-2000

Veterans Affairs

Veterans Certification Officer
146 Silas H. Hunt Hall..... 575-5454
Veterans Resource and Information Center
632 Arkansas Union 575-8742

University of Arkansas

Mailing Address:

Use an office and building address from above, plus:

1 University of Arkansas
Fayetteville, AR 72701

Telephone Area Code: 479

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Editor: Charlie Alison

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The Office of Affirmative Action, Room 4, West Avenue Annex, has been designated to coordinate efforts to comply with the provisions of Title VI of the Civil Rights Act of 1964, Title IX of the Educational Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act, and the Civil Rights Act of 1991.

UNIVERSITY OF ARKANSAS 2012-2013 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.

Fayetteville, Arkansas

Published one time each summer by University Relations and the Office of Academic Affairs.

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Students who enter a college within the University of Arkansas in the academic year of this catalog generally may expect to follow the graduation requirements set forth by that college in this catalog. Because the faculty of each college reserves the right to change graduation requirements, students should meet with their college advisers regularly to be certain that they are aware of any changes in graduation requirements that may apply to them.

Acceptance of registration by the University of Arkansas and admission to any educational program of the University does not constitute a contract or warranty that the University will continue indefinitely to offer the program in which a student is enrolled. The University expressly reserves the right to change, phase out, or discontinue any program.

The listing of courses contained in any University bulletin, catalog, or schedule is by way of announcement only and shall not be regarded as an offer of contract. The University expressly reserves the right to 1) add or delete courses or programs from its offerings, 2) change times or locations of courses or programs, 3) change academic calendars without notice, 4) cancel any course for insufficient registrations, or 5) revise or change rules, charges, fees, schedules, courses, requirements for degrees and any other policy or regulation affecting students, including, but not limited to, evaluation standards, whenever the same is considered to be in the best interests of the University of Arkansas.

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2012 Academic Calendar

Summer Session I 2012 - First Six Weeks (29 Class Days)

May 21	Classes begin
May 22	Last day to register, add a course, or change from audit to credit
May 24	Last day to drop without a mark of "W" or change from credit to audit
May 28	Memorial Day Holiday
June 18	Last day to drop a Session I class
June 29	Last day to officially withdraw from Session I
June 29	Last day of classes for Session I

Summer Session II 2012 - Second Six Weeks (29 Class Days)

July 2	Classes begin
July 3	Last day to register, add a course, or change from audit to credit
July 4	Independence Day Holiday
July 6	Last day to drop without a mark of "W" or change from credit to audit
July 30	Last day to drop a Session II class
August 10	Last day to officially withdraw from Session II
August 10	Last day of classes for Session II

Summer Session III 2012 - Twelve Weeks (58 Class Days)

May 21	Classes begin
May 24	Last day to register, add a course, or change from audit to credit
May 28	Memorial Day Holiday
May 31	Last day to drop without a mark of "W" or change from credit to audit
July 4	Independence Day Holiday
July 17	Last day to drop a Session III class
August 10	Last day to officially withdraw from Session III
August 10	Last day of classes for Session III

Summer Session IV 2012 - Ten Weeks (49 Class Days)

June 4	Classes begin
June 6	Last day to register, add a course, or change from audit to credit
June 12	Last day to drop without a mark of "W" or change from credit to audit
July 4	Independence Day Holiday
July 19	Last day to drop a Session IV class
August 10	Last day to officially withdraw from Session IV
August 10	Last day of classes for Session IV

Summer Session V 2012 - First Five Weeks (24 Class Days)

June 4	Classes begin
June 5	Last day to register, add a course, or change from audit to credit
June 6	Last day to drop without a mark of "W" or change from credit to audit
June 26	Last day to drop a Session V class
July 4	Independence Day Holiday
July 6	Last day to officially withdraw from Session V
July 6	Last day of classes for Session V

Summer Session VI 2012 - Second Five Weeks (25 Class Days)

July 9	Classes begin
July 10	Last day to register, add a course, or change from audit to credit
July 11	Last day to drop without a mark of "W" or change from credit to audit
July 31	Last day to drop a Session VI class
August 10	Last day to officially withdraw from Session VI
August 10	Last day of classes for Session VI

Fall 2012 (74 Class Days; 44 MWF, 30 TT)

August 20	Classes begin
August 24	Last day to register, add a course, or change from audit to credit
August 31	Last day to drop without a mark of "W" or change from credit to audit
September 3	Labor Day Holiday
October 15-16	Fall Break (administrative offices will be open)
Oct. 29-Nov. 9	Priority Registration for Spring 2012
November 16	Last day to drop a full semester class
November 21	Thanksgiving Break (administrative offices open)
November 22-23	Thanksgiving Holiday
December 6	Last day to officially withdraw from all classes
December 6	Last day of classes for fall semester
December 7	Dead Day
December 10-14	Final exams
December 15	Commencement

2013 Academic Calendar

Spring 2013 (73 Class Days; 43 MWF, 30 TT)

January 14	Classes begin
January 18	Last day to register, add a course, or change from audit to credit
January 21	Martin Luther King Day
January 28	Last day to drop without a mark of "W" or change from credit to audit
March 18-22	Spring Break Week
April 19	Last day to drop a full semester class
May 2	Last day to officially withdraw from all classes
May 2	Last day of classes for spring semester
May 3	Dead Day
May 6-10	Final exams
May 11	Commencement
May 18	Law School Commencement

Summer Session I 2013 - First Six Weeks (29 Class Days)

May 20	Classes begin
May 27	Memorial Day Holiday
June 28	Last day of classes for Session I

Summer Session II 2013 - Second Six Weeks (29 Class Days)

July 1	Classes begin
July 4	Independence Day Holiday
August 9	Last day of classes for Session II

Summer Session III 2013 - Twelve Weeks (58 Class Days)

May 20	Classes begin
May 27	Memorial Day Holiday
July 4	Independence Day Holiday
August 9	Last day of classes for Session III

Summer Session IV 2013 - Ten Weeks (49 Class Days)

June 3	Classes begin
July 4	Independence Day Holiday
August 9	Last day of classes for Session IV

Summer Session V 2013 - First Five Weeks (24 Class Days)

June 3	Classes begin
July 4	Independence Day Holiday
July 5	Last day of classes for Session V

Summer Session VI 2013 - Second Five Weeks (25 Class Days)

July 8	Classes begin
August 9	Last day of classes for Session VI

MAY 2012							JANUARY 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
6	7	8	9	10	11	12	6	7	8	9	10	11	12
13	14	15	16	17	18	19	13	14	15	16	17	18	19
20	21	22	23	24	25	26	20	21	22	23	24	25	26
27	28	29	30	31			27	28	29	30	31		
JUNE 2012							FEBRUARY 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
3	4	5	6	7	8	9	3	4	5	6	7	8	9
10	11	12	13	14	15	16	10	11	12	13	14	15	16
17	18	19	20	21	22	23	17	18	19	20	21	22	23
24	25	26	27	28	29	30	24	25	26	27	28		
JULY 2012							MARCH 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	3	4	5	6	7	8	9
8	9	10	11	12	13	14	10	11	12	13	14	15	16
15	16	17	18	19	20	21	17	18	19	20	21	22	23
22	23	24	25	26	27	28	24/31	25	26	27	28	29	30
29	30	31											
AUGUST 2012							APRIL 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
5	6	7	8	9	10	11	7	8	9	10	11	12	13
12	13	14	15	16	17	18	14	15	16	17	18	19	20
19	20	21	22	23	24	25	21	22	23	24	25	26	27
26	27	28	29	30	31		28	29	30				
SEPTEMBER 2012							MAY 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
2	3	4	5	6	7	8	5	6	7	8	9	10	11
9	10	11	12	13	14	15	12	13	14	15	16	17	18
16	17	18	19	20	21	22	19	20	21	22	23	24	25
23/30	24	25	26	27	28	29	26	27	28	29	30	31	
OCTOBER 2012							JUNE 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
7	8	9	10	11	12	13	2	3	4	5	6	7	8
14	15	16	17	18	19	20	9	10	11	12	13	14	15
21	22	23	24	25	26	27	16	17	18	19	20	21	22
28	29	30	31				23/30	24	25	26	27	28	29
NOVEMBER 2012							JULY 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
4	5	6	7	8	9	10	7	8	9	10	11	12	13
11	12	13	14	15	16	17	14	15	16	17	18	19	20
18	19	20	21	22	23	24	21	22	23	24	25	26	27
25	26	27	28	29	30		28	29	30	31			
DECEMBER 2012							AUGUST 2013						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
2	3	4	5	6	7	8	4	5	6	7	8	9	10
9	10	11	12	13	14	15	11	12	13	14	15	16	17
16	17	18	19	20	21	22	18	19	20	21	22	23	24
23/30	24/31	25	26	27	28	29	25	26	27	28	29	30	31

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Juana R. Young, M.L.S., Associate Director of Libraries (Ex-officio)

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			Letter of Recommend.	Dept. Appl. & Admission Requirements	Dissertation or Thesis Required	For. Lang. Required for Graduation
			GRE	MAT	GMAT				
Accounting ¹	ACCT	M.Acc.	N	N	Y	3B	B	N	N
Adult and Lifelong Learning	ADLL	M.Ed.	N	N	N	N	Y	Opt	N
Agricultural & Extension Education	AEED	M.S.	Y	or Y	N	Y	N	N	N
Agricultural Economics	AEAB	M.S.	Opt	Opt	Opt	3	N	Opt	N
Agricultural, Food and Life Sciences	AFLS	M.S.	Opt.	Opt.	N	3	N	N	N
Animal Science	ANSC	M.S.	A	N	N	3	N	Y	N
		Ph.D.	A	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
Art	ARTS	M.F.A.	N	N	N	3	B + images	Y	N
Athletic Training	ATTR	M.A.T.	N	N	N	3	Essay	Opt	N
Biological Engineering ⁴	BENG	M.S.B.E.	Y	N	N	3	Y	Y	Opt
Biology	BISC	M.S.	G	N	N	3	Y	Y	N
		Ph.D.	G	N	N	3	Y	Y	N
Biomedical Engineering	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	CHEG	M.S.Ch.E.	Y	N	N	Opt	Y	Opt	N
Chemistry	CHBC	M.S.	Y	N	N	3	N	Y	N
		Ph.D.	Y	N	N	3	N	Y	N
Childhood Education	CIED	M.A.T.	N	N	N	N	Y	N	N
Civil Engineering ⁴	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.	N	N	N	Y	Centralized Electronic App	N	N
Community Health Promotion ³	HKRD	M.S.	Opt	Opt	N	N	N	Opt	N
		Ph.D.	Y	N	N	3	Y	Y	N
Comparative Literature and Cultural Studies	INTD	M.A.	Y	N	N	3	B	Opt	Y
		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	CSCE	M.S.Cmp.E.	Y	N	N	3	Y	Opt	N
Counseling	RHRC	M.S.	N	N	N	3B	Y	Opt	N
Counselor Education	RHRC	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	Stmt of Purpose + 3 ref letters	Y	N
		Ph.D.	N	N	N	3	Stmt of Purpose + 3 ref letters	Y	N
Curriculum & Instruction	CIED	M.Ed.	Y	N	N	N	N	N	N
		Ed.S.	Y	N	N	N	N	N	N
		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 Policy	EDRE	Ph.D.	Y	N	N	2	B	Y	N
Educational Leadership	CIED	M.Ed.	N	N	N	N	N	Opt	N
		Ed.S.	Y	N	N	3B	Y	N	N
		Ed.D.	Y	N	N	3B	Y	Y	N
Educational Statistics and Research Methods	CIED	M.S.	Y	N	N	Opt	Y	Y	N
		Ph.D.	Y	N	N	Opt	Y	Y	Y
Educational Technology	CIED	M.Ed.	N	N	N	N	N	Opt	N
Electrical Engineering ⁴	ELEG	M.S.E.E.	Y	N	N	3	Stmt of Goals	Opt	N
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	Ph.D.	Y	N	N	3	Y	Y	Opt.
• Chemical Engineering	CHEG	Ph.D.	Y	N	N	Opt	Y	Y	N
• 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	CV + Stmt of Purpose	Y	N
• Mechanical Engineering	MEEG	Ph.D.	A	N	N	Y	CV + Stmt of Purpose	Y	N

Degree Programs	Department	Degree	Test Required for Admission			Letter of Recommend.	Dept. Appl. & Admission Requirements	Dissertation or Thesis Required	For. Lang. Required for Graduation
			GRE	MAT	GMAT				
English	ENGL	M.A.	Y	N	N	3	B	Opt	Y
		Ph.D.	G,S	N	N	3	B	Y	Y
Entomology	ENTO	M.S.	Y	N	N	3	CV/Stmt of Goals	Y	N
		Ph.D.	Y	N	N	3	CV/Stmt of Goals	Y	Opt
Environmental Dynamics	INTD	Ph.D.	Y	N	N	3	B+Writing Sample+ Stmt of Purpose	Y	N
Environmental Engineering ⁴	CVEG	M.S.En.E.	Y	N	N	N	N	Opt.	N
Finance ¹	FINN	Ph.D.	N	N	Y	3B	B	Y	N
Food Science	FDSC	M.S.	Y	N	N	2	Stmt of Purpose	Y	N
		Ph.D.	Y	N	N	2	Stmt of Purpose	Y	N
French	FLAN	M.A.	N	N	N	Y	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
Geosciences	GEOS	Ph.D.	Y	N	N	3	Y	Y	N
German	FLAN	M.A.	N	N	N	3	Writing Sample+ Stmt of Purpose	N	N
Higher Education ³	RHRC	M.Ed.	N	N	N	3B	Y	Opt	N
		Ed.D.	Y	Y	N	3B	B	Y	N
History	HIST	M.A.	Y	N	N	N	N	Y	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	INEG	M.S.I.E.	Y	N	N	3	CV+Stmt of Purpose	Opt	N
Information Systems ¹	ISYS	M.I.S.	N	N	Y	3B	B	N	N
Journalism	JOUR	M.A.	G	N	N	3	CV+Stmt of Purpose	Y	N
Kinesiology	HKRD	M.S.	N	N	N	N	N	Opt	N
		Ph.D.	Y	N	N	3	Y	Y	N
Management		Ph.D.	N	N	Y	3B	B	Y	N
Marketing		Ph.D.	N	N	Y	3B	B	Y	N
Mathematics	MASC	M.S.	N	N	N	N	N	Opt	N
		Ph.D.	N	N	N	N	N	Y	N
Mechanical Engineering ⁴	MEEG	M.S.M.E.	A	N	N	Y	CV + Stmt of Purpose	Opt	N
Microelectronics-Photonics	INTD	M.S.	P	N	N	3	B	P	N
		Ph.D.	P	N	N	3	B	Y	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
Philosophy	PHIL	M.A.	Opt	N	N	3	Y	Y	N
		Ph.D.	Opt	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.	Y	N	N	3	Y	Y	N
Recreation and Sport Management ³	HKRD	M.Ed.	Opt	Opt	N	N	N	Opt	N
		Ed.D.	Y	Y	N	3B	B	Y	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	N	N	N	Y	Opt	N
Secondary Mathematics	MASC	M.A.	N	N	N	N	N	Opt	N
Social Work	SCWK	MSW	N	N	N	3	Y	Opt	N
Sociology	SOCI	M.A.	Y	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
Supply Chain Management		Ph.D.	N	N	Y	3B	B	Y	N
Human Resource and Workforce Development Education	RHRC	M.Ed.	N	N	N	N	Y	N	N
		Ed.D.	Y	N	N	B	B	Y	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 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 ¹	Student	By the following deadlines for the semester in which the degree is to be awarded: Fall - Oct. 1; Spring - March 1; Summer - July 1
Inclusion of name for commencement exercises, regalia, and announcement orders	Student	Deadlines indicated in on the Registrar's Office web page at http://registrar.uark.edu/968.php
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 <i>Theses and Dissertations</i> from the Web	Student	Before first draft of thesis is typed
Submission of preliminary copies to each thesis committee member	Student	At least three weeks before theses are due in the Graduate School
Defense of thesis (certified by submission of Record of Progress with original signatures ¹)	Thesis Committee	At least two weeks before theses are due to the Graduate School
Registration for at least six hours of thesis	Student	Before graduation
Preliminary editorial check of thesis	Student	At least two weeks before theses are due in the Graduate School
Final copies of thesis to Graduate School	Student submits to Graduate School; Graduate School submits to Library	No later than two weeks 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.

Procedures for Doctoral Degrees

PROCEDURE	RESPONSIBLE PARTY	ACTION DATE
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
Admission to candidacy	Advisory Committee	Before beginning work on the dissertation ¹
Enrollment in at least one hour of graded graduate course work or dissertation credit following passing of candidacy exams	Student	Each semester (including summer) until graduation
Selection of dissertation title and 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 ¹
Registration for at least 18 hours of dissertation	Student	Before graduation
Graduation Application	Student	By the following deadlines for the semester in which the degree is to be awarded: Fall - Oct. 1; Spring - March 1; Summer - July 1
Inclusion of name for commencement exercises, regalia, and announcement orders	Student	Deadlines indicated on the Registrar's Office web page at http://registrar.uark.edu/968.php
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 <i>Guide for Preparing Theses and Dissertations</i> from the Web	Student	Before first draft of dissertation is typed
Submission of Announcement of Defense by memorandum	Dissertation Director	At least two weeks before the defense ²
Defense of dissertation (Certified by submission of Record of Progress with original signatures ¹)	Dissertation Committee	Preferably at least two weeks before dissertations are due to the Graduate School 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	At least two weeks before dissertations are due in the Graduate School ²
Final copies of dissertation to Graduate School	Student submits to Graduate School; Graduate School submits to Library.	No later than two weeks 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.

Message from the Chancellor

Congratulations on your decision to study at the University of Arkansas. You've made a superb choice. If a world-class education is what you are seeking, then there probably has never been a better time in our 140-year history to study here. The spectacular success of the Campaign for the Twenty-First Century has allowed us to provide you with fantastic new educational, recreational, and residential facilities to accommodate the needs of today's student. The 132 newly endowed faculty positions created by the campaign also have allowed us to both retain and attract some of the best teachers, scholars, and researchers found anywhere in the world. More importantly, the 1,738 new student scholarship and fellowship funds created by the campaign have allowed us to attract some of the most academically accomplished students we have ever had. The nation's top students are now choosing the University of Arkansas in record numbers.

So pat yourself on the back. You're part of our university's trend toward excellence. I hope you're as happy to be here as we are to have you. Our top priority at the University of Arkansas is putting you, the student, first. This means providing cutting edge curriculum that is relevant to current needs. This means reducing bureaucratic roadblocks and red tape, and doing everything we can to keep tuition and fee increases to an absolute minimum. We want you to have not only a great education, but a great experience, one you will value for the rest of your life.

I invite you to use this catalog of the University of Arkansas and become better acquainted with who we are and where we're going. On behalf of the university community, we wish you all the best, and we hope this catalog encourages you to take advantage of the lifetime of opportunities awaiting you at the University of Arkansas.

Sincerely,



G. David Gearhart
Chancellor

University Profile

Vision

The University of Arkansas is a flagship university for the integration of student engagement, scholarship and research, and innovation that collectively transforms lives and inspires leadership for a global society.

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 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 140 years, the University has developed into a mature institution with nine schools and colleges, more than 950 faculty members, and 23,000 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 University of Arkansas 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 bachelor’s degrees in 75 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://grad.uark.edu/>.

The Carnegie Foundation categorizes the University of Arkansas as a research institution with “very high research activity,” placing the University among the top 108 universities nationwide and in a class by itself within the state of Arkansas. In its 2011 edition, *U.S. News and World Report* ranked the University among 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.

Classes at the university maintain a 17-to-1 average ratio of students to instructor, although individual classes may range from a large general-lecture class of 200 to a focused special-topics class of 4 or 5 students. University of Arkansas students are given the tools and encouragement needed to excel. Over the last 15 years, Arkansas students have become Rhodes, Gates Cambridge, Madison, Marshall, Goldwater, Fulbright, Boren, Gilman and Truman scholars. Forty students have received National Science Foundation Graduate Research Fellowships

Location

Fayetteville, a thriving city of 73,000 in the northwest corner of the state, is home to the University of Arkansas. Lying on the hilly western edge of the Ozark Mountains, the city boasts a lively cultural scene and easy access to outdoor recreation. The newly opened Crystal Bridges Museum of American Art in nearby Bentonville is the first major American art museum opened in the last 40 years and gives visitors a look at the most influential artists of the 18th, 19th and 20th centuries.

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.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)

Graduate Certificate in Bioenergy and Sustainable Technology

M.S. in Agricultural, Food, and Life Sciences (AFLS)

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.En.E. in Environmental Engineering, in collaboration with
Civil Engineering

Ph.D. in Engineering (BENG)

Department of Biological Sciences (BISC)

M.S. in Biology (BIOL)

Ph.D. in Biology (BIOL)

Department of Biomedical Engineering (BMEG)

M.S.B.Me. in Biomedical Engineering (BMEG)

Ph.D. in Engineering (BMEG)

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.B.A. in Business Administration (WCOB)

Ph.D. in Business Administration (WCOB)

Ph.D. in Economics (ECON)

Graduate Certificates (non-degree) in the following:

Enterprise Systems

Entrepreneurship

Department of Chemical Engineering (CHEG)

M.S.Ch.E. in Chemical 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.En.E. in Environmental Engineering (ENEG)

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)

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 and Instruction (CIED)

M.A.T. in Childhood Education (CHED)
 M.A.T. in Secondary Education (SEED)
 M.Ed. in Curriculum and Instruction (CIED)
 M.Ed. in Educational Administration (EDAD)
 M.Ed. in Educational Leadership (EDLE)
 M.Ed. in Secondary Education (SEED)
 M.Ed. in Special Education (SPED)
 Ed.S. in Curriculum and Instruction (CIED)
 Ed.S. in Educational Leadership (EDLE)
 Ed.D. in Educational Leadership (EDLE)
 Ph.D. in Curriculum & Instruction (CIED)
 Graduate Certificates (non-degree) in the following:
 Applied Behavior Analysis
 Arkansas Curriculum/Program Administrator (ACPA)
 Autism Spectrum Disorders (AUTS)
 Building-Level Administration (PSBL)
 District-Level Administration (PSDL)
 STEM Education for Early Childhood (K-4)

Department of Drama (DRAM)

M.F.A. in Drama (DRAM)

Department of Economics (ECON)

M.A. in Economics (ECON)
 Ph.D. in Economics (ECON)

Department of Education Reform (EDRE)

Ph.D. in Education Policy (EDPO)

Program in Educational Statistics and Research Methods (ESRM)

M.S. in Educational Statistics and Research Methods (ESRM)
 Ph.D. in Educational Statistics and Research Methods (ESRM)
 Graduate Certificates (non-degree) in the following:
 Educational Measurement (EDME)
 Educational Program Evaluation (EDEV)
 Educational Psychology (EDPS)
 Educational Statistics and Research Methods (ESRM)

Department of Electrical Engineering (ELEG)

M.S.E.E. in Electrical Engineering (ELEG)
 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 Geosciences (GEOS)

M.A. in Geography (GEOG)
 M.S. in Geology (GEOL)
 Ph.D. in Geoscience (GEOS)

Department of Health, Human Performance and Recreation (HHPR)

M.AT. in Athletic Training (ATTR)
 M.Ed. in Physical Education (PHED)
 M.Ed. in Recreation and Sport Management (RESM)
 M.S. in Community Health Promotion (CHLP)
 M.S. in Kinesiology (KINS)
 Ed.D. in Recreation and Sport Management (RESM)
 Ph.D. in Community Health Promotion (CHLP)
 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.I.E. in Industrial Engineering (INEG)
 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)

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)
 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 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
 Graduate Certificate (non-degree) in the following:
 Cross-Sector Alliances

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

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

Department of Rehabilitation, Human Resources and Communication Disorders (RHRC)
 M.Ed. in Adult and Lifelong Learning (ADLL)
 M.Ed. in Higher Education (HIED)
 M.Ed. in Human Resource and Workforce Development Education (HRWD)
 M.S. in Communication Disorders (CDIS)
 M.S. in Counseling (CNSL)
 M.S. in Rehabilitation (RHAB)
 Ed.D. in Higher Education (HIED)
 Ed.D. in Workforce Development Education (WDED)
 Ph.D. in Counselor Education (CNED)
 Ph.D. in Rehabilitation (RHAB)

School of Social Work (SCWK)
 M.S.W. in Social Work (SCWK)

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

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

Department of World Languages, Literatures and Cultures (FLAN)
 M.A. in French (FREN)
 M.A. in German (GERM)
 M.A. in Spanish (SPAN)

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

Interdisciplinary Certificate and Degree Programs
 Certificate Programs:
 Cross-Sector Alliances (CSAL)
 Preparing for the Professoriate (PROF)
 Sustainability (SUST)

Degree Programs:
 M.S. in Cell & Molecular Biology (CEMB)
 M.A. in Comparative Literature and Cultural Studies (CLCS)
 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 (CLCS)
 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 of Public Service (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 Dean of the Graduate School and International Education has authority for all matters pertaining to graduate education and concerning graduate students. The Dean also oversees international education at the undergraduate, graduate and faculty levels. The Mission Statement and Goals of the Graduate School may be found in the Graduate School Handbook, available at <http://grad.uark.edu>.

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:

DEGREE-SEEKING

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

NON-DEGREE SEEKING

This enrollment will not lead to a degree.

Application. To ensure that applications are processed in a timely manner, applicants are asked to self-manage the application package and submit all application materials in one large envelope. Please do not mail items separately. 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 online 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
346 N. Arkansas Avenue, STON 50
1 University of Arkansas
Fayetteville, AR 72701
Telephone: 479-575-6246

Transcripts. It is the responsibility of those applicants who desire full graduate standing to request from each college or university which the student has previously attended two official copies of the student's academic record including all courses, grades, and credits attempted and indication of degree(s) earned. Official transcripts should be sent directly to the applicant to be included in the self-managed application package. The applicant must not open the envelopes as transcripts not in the original, sealed envelopes will not be considered official.

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. For applicants with an earned post-baccalaureate degree: A degree program may require transcripts from every institution attended in pursuit of the baccalaureate degree even though the Graduate School Admissions Office does not. Please check with the degree program for specific requirements.

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.) The recommended deadline for fall semester graduate assistantship consideration is February 1st, although departments/programs may have earlier deadlines.

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, \$25 processing fee, and official transcripts from institutions attended after the University of Arkansas Graduate School enrollment. (See Admission Classification: Readmission.) All requirements for the master's and specialist degrees must be completed within six years; all requirements for the doctoral degree must be completed within seven years. Absence from the University does not change these time limits.

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 one calendar year 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 one year 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 program 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. All 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), 79 on the Internet-based Test of English as a Foreign Language (TOEFL), or a 58 on

the Pearson Test of English - Academic (PTE-A), 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. Students applying to a Ph.D. program in the Sam M. Walton College of Business must submit one of these tests at the time of admission. 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, even if eligible for a TOEFL waiver, must demonstrate competency in spoken English by submitting a test score of at least 7 on the IELTS (speaking) sub-test, 26 on the Internet-based TOEFL (speaking) sub-test, 71 on the PTE-A (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. Students applying to a Ph.D. program in the Sam M. Walton College of Business must submit one of these tests below at the time of admission.

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 (Writing), IELTS (writing), PTE-A (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(s) 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, although individual departments may require any of these tests for admission. (Please note that those students who will be in graduate assistantships in which they will have direct contact with students in a teaching or tutorial role must still demonstrate proficiency in spoken English, even if they qualify for one of these exemptions.)

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 an Internet-based TOEFL writing score of 29, IELTS (writing) score of 7.0, or PTE-A writing score of 80.
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 World Languages, Literatures and Cultures 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 \$15 charge. Graduate students assessed course work as

a result of performance on the ELPT, TOEFL writing, IELTS writing, PTE-A 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, 346 N. Arkansas Avenue, STON 50, 1 University of Arkansas, 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 Examination 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; or
 - 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.

Visiting Graduate Students: A graduate student who is in good standing at another accredited institution may be given admission (non-degree status) to the Graduate School for one semester (renewable) upon submission of an Application for Admission and a letter of good standing from the Dean of the Graduate School at that institution. If the student's first language is not English, TOEFL requirements will apply, but programs may petition for a student to be admitted without the TOEFL score. 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, to have official transcripts sent from each institution previously attended, and to submit a TOEFL score, if appropriate.

Readmission. *Readmission to the Graduate School is not automatic.*

1. 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:
 - a. The student has earned at least a 2.85 cumulative grade-point average on all graduate credits attempted during all previous enrollments;
 - b. A new Application for Admission form (and \$25 processing fee) is filed prior to the desired registration date (preferably, at least one month prior to that date);
 - c. 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;
 - d. The student's graduate status at the end of the previous enrollment was "good standing."
2. All requirements for the master's and specialist degrees must be completed within six years of the first enrollment used for the degree; all requirements for the doctoral degree must be completed within seven years from the original date of the Record of Progress. Absence from the University does not change these time limits. Students may petition for extensions to these time limits only if the course work was completed at the University of Arkansas (Fayetteville).
3. 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.

4. 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.
5. 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 at the University of Arkansas may request that up to twelve hours of courses taken in the final twelve month period 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 (unless the student is in a program where this has been approved by the Graduate Council), 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.

Sometimes students have completed their undergraduate degrees elsewhere, but have then taken course work as undergraduate students at the University of Arkansas after completing their undergraduate degree, but before being admitted to the Graduate School. Such students may request that up to six hours of courses taken in the final twelve months of undergraduate enrollment prior to admission to the Graduate School count toward their degrees. All of the rules stated in this policy are also applicable to this type of situation.

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 and Academic Outreach, 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 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 information on this degree program and a description of courses offered, see page 138.

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 leadership 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 leadership 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 of Public Service, 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 leadership 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 know and abide by the University's academic and research integrity policies. 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 on the Registrar's Web site at www.uark.edu/registrar/.

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 formally admitted to a degree program 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://grad.uark.edu/>) and return the form to the office indicated on the form. Students are not able to register themselves out of career. Undergraduate students who register for graduate courses out of career and subsequently are admitted to the Graduate School will not automatically be allowed to use those courses to fulfill requirements of their graduate degrees. See the policy on retroactive graduate credit.

Graduate Credit for 3000 and 4000-level Undergraduate Courses

Graduate students wishing to take 3000-level undergraduate courses for graduate credit will find the necessary forms on the Graduate School Web site 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.

Students wishing to take 4000-level undergraduate courses for graduate credit will find the necessary forms on the Graduate School Web site at <http://grad.uark.edu/>. 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.

Proper Address of Students

All students are responsible for maintaining their addresses with the University and to report any change of address by update on the University's student information system at ISIS.uark.edu. Failure to do so may result in undelivered grades, registration notices, invoices, invitations, or other official correspondence and announcements. It is also vitally important that students regularly check their university-assigned e-mail account as many important notices will be sent by e-mail.

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 the fall or spring 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 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 on the Treasurer's Web site.

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 officially withdraw by logging onto the student information system and completing a brief online interview. Students choosing not to complete the exit interview must notify the Registrar's Office by signed, written request. 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 on 50 percent appointment or more, or students with research fellowships, 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 for graduate assistants on 50% appointments for a six-week summer term will be paid up to a maximum of 6 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 graded graduate course credit or dissertation credit 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 may 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 or be entered in the student affiliates table on ISIS. Requests for affiliate status for graduate students must be sent from the major professor to the Graduate School.

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” is recorded. For students admitted to the Graduate School in Fall 2001 or after no credit is earned for courses in which a grade of “F” or “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, or with the faculty member's chairperson or area coordinator. The student's questions may be answered satisfactorily during this discussion. The student may also choose to contact the University Ombuds Office 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) notify the Academic Appeals Subcommittee of the Graduate Council, which will serve as the hearing committee. 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 who is not a member of the Academic Appeals Subcommittee 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 has set the following limits on holding graduate assistantships (not fellowships): Master's students may hold a graduate assistantship for no more than four major semesters; a doctoral student may hold a graduate assistantship for no more than eight major semesters; a student who enters a doctoral program with only a baccalaureate degree may hold a graduate assistantship for no more than ten major semesters. The department/program may petition the Graduate School for extensions to these requirements on a case by case basis.
4. 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).
5. 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. The notice should explain the reasons for the termination of the assistantship. 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. Students also may seek the assistance of the University Ombuds Office, prior to the filing of a formal grievance. 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 the Academic Appeals Subcommittee of the Graduate Council, which will serve as the hearing committee. 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 who is not on the Academic Appeals Subcommittee will serve as the non-voting 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 spon-

sor 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 AND SCHOLARLY MISCONDUCT POLICIES AND PROCEDURES

I. Introduction

A. General Policy

The University of Arkansas is committed to the highest integrity in research and scholarly activity. Actions which fail to meet this standard can undermine the quality of academic scholarship and harm the reputation of the University. This policy is designed to help ensure that all those associated with the University of Arkansas carry out their research and scholarly obligations in a manner that is consistent with the mission and values of the University, and provides a means of addressing instances of suspected research misconduct should they arise.

Principal investigators are responsible for maintaining ethical standards in the projects they direct and reporting any violations to the appropriate University official. Students charged with academic misconduct are subject to separate disciplinary rules governing students, however, such cases may also be reviewed under these policies if applicable under the provisions stated below. The Research Integrity Officer, in consultation with the student's dean shall determine which policy is most appropriate in each case.

A charge of research misconduct is very serious, and will be reviewed carefully and thoroughly. Any allegation of research misconduct will be handled as confidentially and expeditiously as possible. Full attention will be given to the rights and responsibilities of all individuals involved. Charges of research misconduct which are determined not to be made in good faith, as provided for in this policy, may result in administrative action against the charging party.

B. Scope

This statement of policy and procedures is intended to carry out the responsibilities of the University of Arkansas, Fayetteville under the Public Health Service (PHS) Policies on Research Misconduct, 42 CFR Part 93 and the research misconduct policies of other funding agencies, as applicable to particular allegations.

This document applies to allegations of research misconduct (as defined below) involving:

- A person who, at the time of the alleged research misconduct, was employed by, was an agent of, or was affiliated by enrolled student status, contract or agreement with the University of Arkansas, Fayetteville; and
- is accused of plagiarism, fabrication, or falsification of research records produced in the course of research, research training or activities related to that research or research training. This includes any research formally proposed, performed, reviewed, or reported, or any document or record generated in connection with such research, regardless of whether an application or proposal for funds resulted in a grant, contract, cooperative agreement, or other form of support.

Severance of the respondent's relationship with the University, whether by resignation or termination of employment, completion of or withdrawal from studies, or otherwise, before or after initiation of procedures under this policy, will not preclude or terminate research misconduct procedures.

II. Definitions and Standard of Review

Charge. A written allegation of misconduct that triggers the procedures described in this policy.

Complainant. A person who submits a charge of research misconduct.

Deciding Official (DO). The Provost and Vice Chancellor for Academic Affairs who is the institutional official responsible for making determinations, subject to appeal, on allegations of research misconduct and any institutional administrative actions. The Deciding Official will not be the same individual as the Research Integrity Officer and should have no direct prior involvement in the institution's allegation assessment, inquiry, or investigation. Discussing concerns regarding suspected research misconduct, as provided for in Section IV.A. of this policy, shall not be considered direct prior involvement. If the Deciding Official is unable to serve as DO in a particular matter, the Chancellor may appoint an appropriate official to act as the DO for purposes of that matter.

Good Faith Charge. A charge of research misconduct made by a complainant who believes that research misconduct may have

occurred. A charge is not in good faith if it is made with reckless disregard for or willful ignorance of facts that would disprove the charge.

Inquiry. The process under the policy for information gathering and preliminary fact-finding to determine if a charge or apparent instance of research misconduct has substance and therefore warrants an investigation.

Investigation. The process under this policy for the formal examination and evaluation of all relevant facts to determine whether research misconduct has occurred, and, if so, the responsible person and the seriousness of the misconduct.

Investigator. Any person, including but not limited to any person holding an academic or professional staff appointment at the University of Arkansas, who is engaged in the design, conduct, or reporting of research.

ORI. The Office of Research Integrity within the U.S. Department of Health and Human Services.

PHS. The Public Health Service within the U.S. Department of Health and Human Services.

Preponderance of Evidence. Evidence which is of greater weight or more convincing than evidence to the contrary; evidence which shows that something more likely than not is true.

Recklessly. To act recklessly means that a person acts in such a manner that the individual consciously disregards a substantial and unjustifiable risk or grossly deviates from the standard of conduct that a reasonable individual would observe; reckless means more than mere or ordinary negligence.

Research. A systematic investigation designed to develop or contribute to generalizable knowledge. The term includes the search for both basic and applied knowledge and well as training methods by which such knowledge may be obtained.

Research Integrity Officer (RIO) means the Chair of the Research Council who is the institutional official responsible for: (1) assessing allegations of research misconduct to determine if the allegations fall within the definition of research misconduct, are covered by 42 CFR Part 93 or other applicable federal policies, and warrant an inquiry on the basis that the allegation is sufficiently credible and specific so that potential evidence of research misconduct may be identified; (2) overseeing inquiries and investigations; and (3) the other responsibilities described in this policy. If the Research Integrity Officer is unable to serve as RIO in a particular matter, the DO may appoint an appropriate official to act as the RIO for purposes of that matter.

Research Misconduct. Research misconduct means the fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

1. Fabrication is making up data or results and recording or reporting them.
2. Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
3. Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

Research misconduct does not include disputes regarding honest error or honest differences in interpretations or judgments of data, and is not intended to resolve bona fide scientific disagreement or debate. Research misconduct is also not intended to include "authorship" disputes such as complaints about appropriate ranking of co-authors in publications, presentations, or other

work, unless the dispute constitutes plagiarism (as defined above).

Research Record. Any data, document, computer file, computer storage media, or any other written or non-written account or object that reasonably may be expected to provide evidence or information regarding the proposed, conducted, or reported research that constitutes the subject of a charge of research misconduct. A research record includes, but is not limited to, grant or contract applications, whether funded or unfunded; grant or contract progress and other reports; laboratory notebooks; notes; printed or electronic correspondence; memoranda of telephone calls; videos; photographs; X-ray film; slides; biological materials; computer files and printouts; manuscripts and publications; equipment use logs; laboratory procurement records; animal facility records; human and animal subject protocols; consent forms; medical charts; and patient research files.

Respondent. The person against whom a charge of research misconduct is directed, or the person whose actions are the subject of an inquiry or investigation.

Standard of Review.

A finding of research misconduct requires that:

1. There be a significant departure from accepted practices of the relevant research community; and
2. The research misconduct be committed intentionally, knowingly, or recklessly; and
3. The allegation be proven by a preponderance of the evidence.

This standard and related definitions are restated in the charge to the investigation committee located in section V.E. of this policy.

III. Rights and Responsibilities

A. Research Integrity Officer

The Chair of the Research Council will serve as the RIO who will have primary responsibility for implementation of the institution's policies and procedures on research misconduct. These responsibilities include the following duties related to research misconduct proceedings:

- Consult confidentially with persons uncertain about whether to submit an allegation of research misconduct;
- Receive allegations of research misconduct;
- Assess each allegation of research misconduct in accordance with Section V.A. of this policy to determine whether the allegation falls within the definition of research misconduct and warrants an inquiry;
- As necessary, take interim action and notify ORI of special circumstances, in accordance with Section IV.H. of this policy;
- Sequester research data and evidence pertinent to the allegation of research misconduct in accordance with Section V.C. of this policy and maintain it securely in accordance with this policy and applicable law and regulation;
- Provide confidentiality to those involved in the research misconduct proceeding as required by 42 CFR § 93.108 or other applicable law or regulations, or institutional policy;
- Notify the respondent and provide opportunities for him/her to review/ comment/respond to allegations, evidence, and committee reports in accordance with Section III.C. of this policy.
- Inform respondents, complainants, and witnesses of the procedural steps in the research misconduct proceeding;
- Appoint the chair and members of the inquiry and investigation committees, ensure that those committees are properly staffed and that there is expertise appropriate to carry out a

thorough and authoritative evaluation of the evidence;

- Determine whether each person involved in handling an allegation of research misconduct has an unresolved personal, professional, or financial conflict of interest and take appropriate action, including recusal, to ensure that no person with such conflict is involved in the research misconduct proceeding;
- In cooperation with other institutional officials, take all reasonable and practical steps to protect or restore the positions and reputations of good faith complainants, witnesses, and committee members and counter potential or actual retaliation against them by respondents or other institutional members;
- Keep the Deciding Official and others who need to know apprised of the progress of the review of the allegation of research misconduct;
- Notify and make reports to ORI or other applicable federal agencies as required by 42 CFR Part 93 or other applicable law or regulations;
- Ensure that administrative actions taken by the institution, ORI, or other appropriate agencies are enforced and take appropriate action to notify other involved parties, such as sponsors, law enforcement agencies, professional societies, and licensing boards of those actions; and
- Maintain records of the research misconduct proceeding and make them available to ORI or other appropriate agencies as applicable in accordance with Section VIII.F. of this policy.

B. Complainant

The complainant is responsible for making allegations in good faith, maintaining confidentiality to the extent permitted by law, and cooperating with the inquiry and investigation. As a matter of good practice, the complainant should be interviewed at the inquiry stage and given the transcript of the interview for comment. The complainant must be interviewed during an investigation, and be given the transcript of the interview for comment. The complainant may be provided for comment with (1) relevant portions of the inquiry report (within a timeframe that permits the inquiry to be completed within 60 days of its initiation); and (2) relevant portions of the draft investigation report. In reviewing reports, the complainant must adhere to time limits set by the corresponding committee for timely completion of the inquiry or investigation

C. Respondent

The respondent is responsible for maintaining confidentiality and cooperating with the conduct of an inquiry and investigation. The respondent is entitled to:

- A good faith effort from the RIO to notify the respondent in writing at the time of or before beginning an inquiry;
- An opportunity to comment on the inquiry report and have his/her comments attached to the report;
- Be notified of the outcome of the inquiry, and receive a copy of the inquiry report that includes a copy of, or refers to 42 CFR Part 93 or other applicable law or regulations and the institution's policies and procedures on research misconduct;
- Be notified in writing of the allegations to be investigated within a reasonable time after the determination that an investigation is warranted, but before the investigation begins (within 30 days after the institution decides to begin an investigation), and be notified in writing of any new allegations, not addressed in the inquiry or in the initial notice of investigation, within a reasonable time after the determination

to pursue those allegations;

- Be interviewed during the investigation, have the opportunity to correct the recording or transcript, and have the corrected recording or transcript included in the record of the investigation;
- Have a good faith effort made to interview during the investigation any witness who has been reasonably identified by the respondent as having information on relevant aspects of the investigation, have the recording or transcript provided to the witness, have the witness suggest any corrections in the transcript, and have the recording or corrected transcript included in the record of investigation; and
- Receive a copy of the draft investigation report and, concurrently, a copy of, or supervised access to any records or materials on which the report is based, and be notified that any comments must be submitted within 30 days of the date on which the copy was received and that the comments will be considered by the institution and addressed in the final report
- Appeal the decision of the DO as provided in Section XIII.D.

The respondent should be given the opportunity to admit that research misconduct occurred and that he/she committed the research misconduct. With the advice of the RIO and/or other institutional officials, the Deciding Official may terminate the institution's review of an allegation that has been admitted, if the institution's acceptance of the admission and any proposed resolution is approved by ORI or the appropriate federal agency, if required.

D. Deciding Official

The DO will receive the inquiry report and after consulting with the RIO and/or other institutional officials, decide whether an investigation is warranted under this policy, the criteria in 42 CFR § 93.307(d), or other applicable law or regulations. Any finding that an investigation is warranted must be made in writing by the DO and must be provided to ORI or other federal agencies, if required, together with a copy of the inquiry report meeting the requirements of 42 CFR § 93.309, within 30 days of the finding. If it is found that an investigation is not warranted, the DO and the RIO will ensure that detailed documentation of the inquiry is retained for at least 7 years after termination of the inquiry, so that ORI or other applicable agencies may assess the reasons why the institution decided not to conduct an investigation.

The DO will receive the investigation report and, after consulting with the RIO and/or other institutional officials, decide the extent to which this institution accepts the findings of the investigation and, if research misconduct is found, decide what, if any, institutional administrative actions are appropriate. The DO shall ensure that the final investigation report, the findings of the DO and a description of any pending or completed administrative actions are provided to ORI, as required by 42 CFR § 93.315 or to other federal agencies as required by their respective misconduct policies.

IV. General Policies and Principles

A. Responsibility to Report Misconduct

All institutional members will report observed, suspected, or apparent research misconduct to the RIO, the DO, or their designees. Prior to submitting a formal charge, a potential complainant is encouraged to consult informally with the RIO, the DO, or their designees to consider whether the case involves questions of research misconduct, should be resolved by other University

procedures, or does not warrant further action. Contact information for the RIO may be obtained from the Office of Research Support and Sponsored Programs or the listing of Research Council members on the Faculty Senate website. If the circumstances described by the individual do not meet the definition of research misconduct, but further action is required, the RIO will refer the individual or allegation to other offices or officials with responsibility for resolving the problem.

At any time, to the extent permitted by law, an institutional member may have confidential discussions and consultations about concerns of possible misconduct with the RIO, the DO, or their designees and will be counseled about appropriate procedures for reporting allegations and their obligation to cooperate in any inquiry or investigation that may occur.

B. Cooperation with Research Misconduct Proceedings

Institutional members shall cooperate with the RIO and other institutional officials in the review of allegations and the conduct of inquiries and investigations. Institutional members, including respondents, have an obligation to provide evidence relevant to research misconduct allegations to the RIO or other institutional officials.

C. Confidentiality

The RIO shall, as required by 42 CFR § 93.108 or other applicable law or regulation: (1) limit disclosure of the identity of respondents and complainants to those who need to know in order to carry out a thorough, competent, objective and fair research misconduct proceeding; and (2) except as otherwise prescribed by law, limit the disclosure of any records or evidence from which research subjects might be identified to those who need to know in order to carry out a research misconduct proceeding.

D. Conflicts of interest

At each stage of handling an inquiry or subsequent investigation, all persons involved shall be vigilant to prevent any real or perceived conflict of interest, or personal conflicts or relationships between colleagues, from affecting the outcome of the proceedings and resolution of the charges. Possible conflicts of interest may include co-authorship of work within the recent past with any of the individuals directly involved with the alleged misconduct, or professional or personal relationship with the respondent beyond that of mere acquaintances or colleagues. Committee members shall not have had any personal, professional or financial involvement with the matters at issue in the investigation that might create an appearance of bias or actual bias. If such relationships or involvement are present, the individual shall recuse himself or herself from any investigative or decisional role in the case. If any prospective committee member at any point in the process presents a conflict of interest, that committee member shall be replaced by another appointee. If the RIO has a conflict of interest, the DO shall appoint a replacement; if the DO has a conflict of interest, the Chancellor shall appoint a replacement. The RIO may use a written conflict of interest statement to implement this provision; a sample statement is referenced in the Appendix to this policy.

E. Protecting complainants, witnesses, and committee members

Institutional members may not retaliate in any way against complainants, witnesses, or committee members. Institutional members should immediately report any alleged or apparent retaliation against complainants, witnesses or committee members to the RIO, who shall review the matter and, as necessary, make all reasonable and practical efforts to counter any potential or actual retaliation and protect and restore the position and reputation of

the person against whom the retaliation is directed.

F. Protecting the Respondent

As requested and as appropriate, the RIO and other institutional officials shall make all reasonable and practical efforts to protect or restore the reputation of persons alleged to have engaged in research misconduct, but against whom no finding of research misconduct is made.

During the research misconduct proceeding, the RIO is responsible for ensuring that respondents receive all the notices and opportunities provided for in 42 CFR Part 93, or other applicable federal policies, and the policies and procedures of the institution.

G. Advisor to the Respondent

The respondent may consult with an advisor, who may or may not be an attorney. The advisor may not be a principal or witness in the case. The advisor may accompany the respondent to proceedings conducted as a part of the research misconduct proceeding, but shall not speak on behalf of the respondent or otherwise participate in the proceedings. The advisor must maintain confidentiality and be available as needed to ensure that all proceedings are completed on a timely basis.

H. Interim Administrative Actions and Notifying ORI or Other Federal Agencies of Special Circumstances

Throughout the research misconduct proceeding, the RIO will review the situation to determine if there is any threat of harm to public health, federal funds and equipment, or the integrity of the research process. In the event of such a threat, the RIO will, in consultation with other institutional officials and ORI or other federal agencies, if applicable, take appropriate interim action to protect against any such threat. Interim action might include additional monitoring of the research process and the handling of federal funds and equipment, reassignment of personnel or of the responsibility for the handling of federal funds and equipment, additional review of research data and results or delaying publication. The RIO shall, at any time during a research misconduct proceeding, consult with appropriate University officials and legal counsel immediately if he/she has reason to believe that any of the following conditions exist:

- Health or safety of the public is at risk, including an immediate need to protect human or animal subjects;
- Federal resources or interests are threatened;
- Research activities should be suspended;
- There is a reasonable indication of possible violations of civil or criminal law;
- Federal action is required to protect the interests of those involved in the research misconduct proceeding;
- The research misconduct proceeding may be made public prematurely and federal action may be necessary to safeguard evidence and protect the rights of those involved; or
- The research community or public should be informed.

Following such consultation, the institution shall take appropriate steps to address such conditions, such as by notifying ORI or other applicable agency.

I. Computation of Time

In this policy, any reference to days shall mean calendar days. Any period of time equal to ten days or fewer shall exclude University holidays. If a deadline falls on a weekend or University holiday, the deadline shall be the next University business day.

J. Procedural Changes

1. Deadlines. Due to the sensitive nature of allegations of misconduct, each case shall be resolved as expeditiously as

possible. The nature of some cases may, however, render normal deadlines difficult to meet. If at any time an established deadline cannot be met, a report shall be filed with the DO setting out the reasons why the deadline cannot be met and estimating when that stage of the process will be completed. A copy of this report shall be provided to the respondent. If PHS funding is involved, an extension must be received from the Office of Research Integrity.

2. Other Procedural Changes. Particular circumstances in an individual case may dictate variation from the procedures set out in this policy in order to ensure fair and efficient consideration of the matter. Any change in the procedures must ensure fair treatment of the respondent. Any major deviations from the procedures described in this policy shall be made only with the written approval of the DO in consultation with the respondent. Any minor deviations from the procedures described in this policy shall not require the written approval of the DO.

K. Exclusive Process

The procedures described in this policy constitute the exclusive process for raising and resolving charges of research misconduct.

V. Conducting the Assessment and Inquiry

A. Assessment of Allegations

Upon receiving an allegation of research misconduct, the RIO will immediately assess the allegation to determine whether it is sufficiently credible and specific so that potential evidence of research misconduct may be identified and further review is warranted. The RIO shall also determine whether the alleged misconduct is within the jurisdictional criteria of 42 CFR § 93.102(b), and whether the allegation falls within the definition of research misconduct in 42 CFR § 93.103. An inquiry must be conducted if these criteria are met. In conducting this assessment, the RIO may consult with the institution's legal counsel and other appropriate University officials. If a charge is frivolous, does not raise questions of research misconduct, is more appropriately resolved by other University procedures, or does not warrant further action, the RIO may, at his or her discretion, handle the matter informally or refer it to the appropriate person or process, and will notify the complainant and anyone else known to be aware of the charge.

The assessment period should be brief, preferably concluded within a week. In conducting the assessment, the RIO need not interview the complainant, respondent, or other witnesses, or gather data beyond any that may have been submitted with the allegation, except as necessary to determine whether the allegation is sufficiently credible and specific so that potential evidence of research misconduct may be identified and further review is warranted. The RIO shall, on or before the date on which the respondent is notified of the allegation, obtain custody of, inventory, and sequester all research records and evidence needed to conduct the research misconduct proceeding, as provided in paragraph C. of this section.

B. Initiation and Purpose of the Inquiry

If the RIO determines that the criteria for an inquiry are met, he or she will immediately initiate the inquiry process. The purpose of the inquiry is to conduct an initial review of the available evidence to determine whether to conduct an investigation. An inquiry does not require a full review of all the evidence related to the allegation.

C. Notice to Respondent; Sequestration of Research Records

At the time of or before beginning an inquiry, the RIO must

make a good faith effort to notify the respondent in writing, if the respondent is known. With the approval of the respondent, the RIO will also notify the dean of the school or college in which the respondent holds his or her primary appointment. If the inquiry subsequently identifies additional respondents, they must be notified in writing. On or before the date on which the respondent is notified, or the inquiry begins, whichever is earlier, the RIO must take all reasonable and practical steps to obtain custody of all the research records and evidence needed to conduct the research misconduct proceeding, inventory the records and evidence and sequester them in a secure manner, except that where the research records or evidence encompass scientific instruments shared by a number of users, custody may be limited to copies of the data or evidence on such instruments, so long as those copies are substantially equivalent to the evidentiary value of the instruments. The RIO may consult confidentially with the institution's legal counsel and other appropriate University officials for advice and assistance in this regard. In addition, if necessary, the RIO may consult with ORI or other applicable federal agency.

D. Appointment of the Inquiry Committee

The RIO, in consultation with other institutional officials as appropriate, shall appoint an inquiry committee and committee chair as soon after the initiation of the inquiry as is practical. The inquiry committee must consist of individuals who do not have unresolved personal, professional, or financial conflicts of interest with those involved with the inquiry and should include individuals with the appropriate scientific expertise to evaluate the evidence and issues related to the allegation, interview the principals and key witnesses, and conduct the inquiry. The RIO shall notify the respondent of the proposed inquiry committee membership. The respondent may then submit a written objection to any appointed member of the inquiry committee based on bias or conflict of interest within seven days. If an objection is raised, the RIO shall determine whether to replace the challenged member with a qualified substitute. The RIO's decision shall be final. The RIO may, with the concurrence of the DO, appoint one or more experts to assist the inquiry committee if necessary to evaluate specific allegations. The RIO shall direct the members of the committee that the investigation and all information relating to the investigation shall be kept confidential.

E. Charge to the Committee and First Meeting

The RIO will prepare a charge for the inquiry committee that:

- Sets forth the time for completion of the inquiry;
- Describes the allegations and any related issues identified during the allegation assessment;
- States that the purpose of the inquiry is to conduct an initial review of the evidence, including the testimony of the respondent, complainant and key witnesses, to determine whether an investigation is warranted, not to determine whether research misconduct definitely occurred or who was responsible;
- States that an investigation is warranted if the committee determines: (1) there is a reasonable basis for concluding that the allegation falls within the definition of research misconduct and is within the jurisdictional criteria of 42 CFR § 93.102(b), if applicable; and, (2) the allegation may have substance, based on the committee's review during the inquiry.
- Informs the inquiry committee that they are responsible for preparing or directing the preparation of a written report of the inquiry that meets the requirements of this Policy and 42

CFR § 93.309(a), if applicable.

At the committee's first meeting, the RIO will review the charge with the committee, discuss the allegations, any related issues, and the appropriate procedures for conducting the inquiry, assist the committee with organizing plans for the inquiry, and answer any questions raised by the committee. The RIO will be present or available throughout the inquiry to advise the committee as needed. Prior to the first meeting, the RIO shall also consult with legal counsel for the institution as to the need for counsel to provide legal advice to the committee at the first meeting and in subsequent phases of the inquiry, including, but not limited to, for the purpose of reviewing institutional policies governing research misconduct proceedings, confidentiality and potential conflicts of interest.

F. Inquiry Process

The inquiry committee shall interview the complainant and the respondent, and may interview witnesses as well as examine relevant research records and materials. Then the inquiry committee will evaluate the evidence, including the testimony obtained during the inquiry. After consultation with the RIO, the committee members will decide whether an investigation is warranted based on the criteria in this policy and 42 CFR § 93.307(d) as applicable. The scope of the inquiry is not required to and does not normally include deciding whether misconduct definitely occurred, determining definitely who committed the research misconduct or conducting exhaustive interviews and analyses. However, if a legally sufficient admission of research misconduct is made by the respondent, misconduct may be determined at the inquiry stage if all relevant issues are resolved. In that case, the institution shall promptly consult with ORI or other appropriate agencies, as required, to determine the next steps that should be taken. See Section IX.

G. Time for Completion

The inquiry, including preparation of the final inquiry report and the decision of the DO on whether an investigation is warranted, must be completed within 60 days of initiation of the inquiry, unless the RIO determines that circumstances clearly warrant a longer period. If the RIO approves an extension, the inquiry record must include documentation of the reasons for exceeding the 60-day period. The respondent will be notified of the extension.

VI. The Inquiry Report

A. Elements of the Inquiry Report

A written inquiry report must be prepared that includes the following information: (1) the name and position of the respondent; (2) a description of the allegations of research misconduct; (3) the PHS or other federal support, if any, including, for example, grant numbers, grant applications, contracts and publications listing support; (4) the basis for recommending or not recommending that the allegations warrant an investigation; (5) any comments on the draft report by the respondent or complainant. An outline for reports to be furnished to ORI is referenced in the Appendix to this policy.

Institutional counsel shall review the draft inquiry report prior to transmission of the draft to the respondent. Modifications shall be made as appropriate in consultation with the RIO and the inquiry committee. The inquiry report shall include the following information: the names and titles of the committee members and experts who conducted the inquiry; a summary of the inquiry process used; a list of the research records reviewed; summaries of

any interviews; and whether any other actions should be taken if an investigation is not recommended.

B. Notification to the Respondent and Opportunity to Comment

The RIO shall notify the respondent whether the inquiry found an investigation to be warranted, together with a copy of the draft inquiry report, and a copy of or reference to 42 CFR Part 93 or other applicable federal policies and the institution's policies and procedures on research misconduct. The report shall clearly be labeled "DRAFT" in bold and conspicuous type font. The RIO shall notify the respondent that the respondent shall have 10 days to comment on the draft inquiry report. The RIO shall also direct the respondent that the draft report shall be kept confidential.

On a case-by-case basis, the RIO may provide the complainant a copy of the draft inquiry report, or relevant portions of it, for comment. If so, the report shall clearly be labeled "DRAFT" in bold and conspicuous type font, and the complainant will be allowed no more than 10 days to submit comments to the RIO. The complainant shall be directed that the draft report shall be kept confidential.

Any comments that are submitted by the respondent or the complainant shall be attached to the final inquiry report. Based on the comments, the inquiry committee may revise the draft report as appropriate and prepare it in final form. The committee will deliver the final report to the RIO. The RIO shall notify the complainant in writing whether the inquiry found an investigation to be warranted.

C. Institutional Decision and Notification

1. Decision by Deciding Official

The RIO will transmit the final inquiry report and any comments to the DO, who will determine in writing whether an investigation is warranted. The inquiry is completed when the DO makes this determination.

2. Notification to ORI and Respondent

Within 30 days of the DO's decision that an investigation is warranted, the RIO will provide ORI, if required, with the DO's written decision and a copy of the inquiry report. The RIO shall also provide a copy of the DO's written decision and a copy of the inquiry report to the respondent within 30 days of the DO's decision. Subject to confidentiality, the RIO will also notify those institutional officials, if any, who need to know of the DO's decision because they will be directly involved in the investigation or otherwise have a need to know because of their official duties. The RIO must provide the following information to ORI, if required, or other applicable federal agency upon request: (1) the institutional policies and procedures under which the inquiry was conducted; (2) the research records and evidence reviewed, transcripts or recordings of any interviews, and copies of all relevant documents; and (3) the charges to be considered in the investigation.

3. Documentation of Decision Not to Investigate

If the DO decides that an investigation is not warranted, the RIO shall secure and maintain for 7 years after the termination of the inquiry sufficiently detailed documentation of the inquiry to permit a later assessment by applicable federal agencies of the reasons why an investigation was not conducted. These documents must be provided to such agencies or their authorized personnel upon request.

VII. Conducting the Investigation

A. Initiation and Purpose

The investigation must begin within 30 days, after the determination by the DO that an investigation is warranted. The purpose of the investigation is to develop a factual record by exploring the allegations in detail and examining the evidence in depth, leading to recommended findings on whether research misconduct has been committed, by whom, and to what extent. The investigation will also determine whether there are additional instances of possible research misconduct that would justify broadening the scope beyond the initial allegations. This is particularly important where the alleged research misconduct involves clinical trials or potential harm to human subjects or the general public or if it affects research that forms the basis for public policy, clinical practice, or public health practice. The findings of the investigation must be set forth in an investigation report.

B. Notifying ORI and Respondent; Sequestration of Research Records

On or before the date on which the investigation begins, the RIO must: (1) notify the ORI Director of the decision to begin the investigation and provide ORI a copy of the inquiry report, if required; and (2) notify the respondent in writing of the allegations to be investigated. The RIO must also give the respondent written notice of any new allegations of research misconduct within a reasonable amount of time of deciding to pursue allegations not addressed during the inquiry or in the initial notice of the investigation.

The RIO will, prior to notifying respondent of the allegations, take all reasonable and practical steps to obtain custody of and sequester in a secure manner all research records and evidence needed to conduct the research misconduct proceeding that were not previously sequestered during the inquiry. The need for additional sequestration of records for the investigation may occur for any number of reasons, including the institution's decision to investigate additional allegations not considered during the inquiry stage or the identification of records during the inquiry process that had not been previously secured. The procedures to be followed for sequestration during the investigation are the same procedures that apply during the inquiry.

C. Appointment of the Investigation Committee

The RIO, in consultation with other institutional officials as appropriate, will appoint an investigation committee and the committee chair as soon after the beginning of the investigation as is practical. The investigation committee must consist of at least three individuals who do not have unresolved personal, professional, or financial conflicts of interest with those involved with the investigation and should include individuals with the appropriate scientific expertise to evaluate the evidence and issues related to the allegation, interview the respondent and complainant and conduct the investigation. Individuals appointed to the investigation committee may also have served on the inquiry committee. When necessary to secure the necessary expertise or to avoid conflicts of interest, the RIO may select committee members from outside the institution, or, with concurrence of the DO, may appoint experts to assist the committee in particular aspects of the case. The RIO will notify the respondent of the proposed investigation committee membership and any appointed experts. If the respondent then submits a written objection to any appointed member or expert based on bias or conflict of interest within seven days, the RIO will determine whether to replace the challenged member

or expert with a qualified substitute, and the decision of the RIO shall be final.

D. Charge to the Committee and the First Meeting

1. Charge to the Committee

The RIO will define the subject matter of the investigation in a written charge to the committee that:

- Describes the allegations and related issues identified during the inquiry;
- Identifies the respondent;
- Informs the committee that it must conduct the investigation as prescribed in paragraph E. of this section;
- Reviews the definition of research misconduct as stated in this Policy;
- Informs the committee that it must evaluate the evidence and testimony to determine whether, based on a preponderance of the evidence, research misconduct occurred and, if so, the type and extent of it and who was responsible;
- Informs the committee that in order to determine that the respondent committed research misconduct it must find that a preponderance of the evidence establishes that: (1) research misconduct, as defined in this policy, occurred (respondent has the burden of proving by a preponderance of the evidence any affirmative defenses raised, including honest error or a difference of opinion); (2) the research misconduct is a significant departure from accepted practices of the relevant research community; and (3) the respondent committed the research misconduct intentionally, knowingly, or recklessly; and
- Informs the committee that it must prepare or direct the preparation of a written investigation report that meets the requirements of this Policy and any other applicable federal policies, such as 42 CFR § 93.313.

2. First Meeting

The RIO will convene the first meeting of the investigation committee to review the charge, the inquiry report, and the prescribed procedures and standards for the conduct of the investigation, including the necessity for developing a specific investigation plan. The RIO shall also direct the members of the committee that the investigation and all information relating to the investigation shall be kept confidential. The investigation committee will be provided with a copy of this statement of policy and procedures and any applicable federal research misconduct policies. The RIO will be present or available throughout the investigation to advise the committee as needed. Prior to the first meeting, the RIO shall also consult with legal counsel for the institution as to the need for counsel to provide legal advice to the committee at the first meeting and in subsequent phases in the investigation, including, but not limited to, for the purpose of reviewing institutional policies governing research misconduct proceedings, confidentiality and potential conflicts of interest.

E. Investigation Process

The investigation committee and the RIO must:

- Use diligent efforts to ensure that the investigation is thorough and sufficiently documented and includes examination of all research records and evidence relevant to reaching a decision on the merits of each allegation;
- Take reasonable steps to ensure an impartial and unbiased investigation to the maximum extent practical;
- Interview each respondent, complainant, and make a good-faith effort to interview any other available person who has

been reasonably identified as having information regarding any relevant aspects of the investigation, including witnesses identified by the respondent, and record or transcribe each interview, provide the recording or transcript to the interviewee for correction, and include the recording or transcript in the record of the investigation; and

- Pursue diligently all significant issues and leads discovered that are determined relevant to the investigation, including any evidence of any additional instances of possible research misconduct, and continue the investigation to completion.

F. Time for Completion

The investigation is to be completed within 120 days of the first meeting of the investigation committee, including conducting the investigation, preparing the report of findings, providing the draft report for comment and sending the final report to ORI, if applicable. However, if the RIO determines that the investigation will not be completed within this 120-day period, he/she will submit a written request for an extension to the DO and to ORI or other applicable federal agencies, setting forth the reasons for the delay. If the request for an extension is approved by the DO and applicable federal agencies, then the RIO will ensure that periodic progress reports are filed with the approving officials.

G. Amended Charges

If issues of research misconduct that fall outside of the charge arise during the course of the investigation, the committee shall so inform the RIO, including in its communication the evidence on which its concerns are based. The RIO in consultation with the DO and the investigation committee, will consider the issues raised and, in the RIO's discretion, provide the investigation committee with an amended charge. The respondent shall be notified of any such amendments.

VIII. The Investigation Report

A. Elements of the Investigation Report

The investigation committee and the RIO are responsible for preparing a written draft report of the investigation that:

- Describes the nature of the allegation of research misconduct, including identification of the respondent and the respondent's curriculum vitae;
- Describes and documents the federal support, if any, including, for example, the numbers of any grants that are involved, grant applications, contracts, and publications listing federal support;
- Describes the specific allegations of research misconduct considered in the investigation;
- Includes the institutional policies and procedures under which the investigation was conducted;
- Identifies and summarizes the research records and evidence reviewed and identifies any evidence taken into custody but not reviewed; and
- Includes a statement of findings for each allegation of research misconduct identified during the investigation. Each statement of findings must: (1) identify whether the research misconduct was falsification, fabrication, or plagiarism, and whether it was committed intentionally, knowingly, or recklessly; (2) summarize the facts and the analysis that support the conclusion and consider the merits of any reasonable explanation by the respondent, including any effort by respondent to establish by a preponderance of the evidence that he or she did not engage in research misconduct because of honest error or a difference of opinion; (3) identify the specific federal support, if any; (4) identify whether any publications need

correction or retraction; (5) identify the person(s) responsible for the misconduct; and (6) list any current support or known applications or proposals for support that the respondent has pending with federal agencies.

- If the committee determines that any allegation of research misconduct is true, the report shall recommend appropriate institutional actions in response to the findings of research misconduct.

The report and other retained documentation must be sufficiently detailed as to permit a later assessment of the investigation. An outline for reports to be furnished to ORI is referenced in the Appendix to this Policy.

B. Comments on the Draft Report and Access to Evidence

The RIO must give the respondent a copy of the draft investigation report for comment and, concurrently, a copy of, or supervised access to the evidence on which the report is based. The report shall clearly be labeled "DRAFT" in bold and conspicuous type font. The respondent will be allowed 30 days from the date he/she received the draft report to submit comments to the RIO. The respondent's comments must be considered and made a part of the final investigation record. The respondent shall be directed that the draft report shall be kept confidential.

On a case-by-case basis, the RIO may provide the complainant a copy of the draft investigation report, or relevant portions of it, for comment. If so, the report shall clearly be labeled "DRAFT" in bold and conspicuous type font, and the complainant will be allowed no more than 30 days from the date on which he/she received the draft report to submit comments to the RIO. The complainant's comments must be included and considered in the final report. The complainant shall be directed that the draft report shall be kept confidential.

C. Decision by Deciding Official

The RIO will assist the investigation committee in finalizing the draft investigation report, including ensuring that the respondent's and, if applicable, complainant's comments are included and considered, and transmit the final investigation report to the DO, who will determine in writing: (1) whether the institution accepts the investigation report, its findings, and the recommended institutional actions; and (2) the appropriate institutional actions in response to the accepted findings of research misconduct. If this determination varies from the findings of the investigation committee, the DO will, as part of his/her written determination, explain in detail the basis for rendering a decision different from the findings of the investigation committee. Alternatively, the DO may return the report to the investigation committee with a request for further fact-finding or analysis. When a final decision on the case has been reached, whether at this stage or after a subsequent appeal, the RIO will notify the respondent in writing. If the DO's findings are not appealed within ten days, the DO's findings shall become the institution's final decision. At the time of a final decision, whether at this stage or after an appeal, the RIO will also notify the complainant in writing of the final outcome of the case. After informing ORI or other applicable federal agency, as required, the DO will determine whether law enforcement agencies, professional societies, professional licensing boards, editors of journals in which falsified reports may have been published, collaborators of the respondent in the work, or other relevant parties should be notified of the outcome of the case. The RIO is responsible for ensuring compliance with all notification requirements of funding or sponsoring agencies.

D. Appeals

The respondent, within ten days of receiving written notification of the decision of the DO, may file an appeal with the Chancellor. The appeal may result in (i) a reversal or modification of the DO's findings of research misconduct or determinations of institutional action, (ii) the Chancellor may direct the DO to return the report to the investigation committee with a request for further fact-finding or analysis, or (iii) other action the Chancellor deems appropriate. The appeal process must be completed within 120 days of the filing of the appeal unless an extension is granted by appropriate officials and federal agencies. The decision of the Chancellor shall be final.

E. Notice to Federal Agencies of Institutional Findings and Actions

Unless an extension has been granted, the RIO must, within the 120-day period for completing the investigation or the 120-day period for completion of an appeal, submit the following to any applicable federal agencies as required: (1) a copy of the investigation report with all attachments and any appeals; (2) the findings of research misconduct, including who committed the misconduct; (3) a statement of whether the institution accepts the findings of the investigation; and (4) a description of any pending or completed administrative actions against the respondent.

F. Maintaining Records for Review by Federal Agencies

If required, the RIO must maintain and provide to ORI, if required, or other applicable federal agencies upon request "records of research misconduct proceedings" as that term is defined by 42 CFR § 93.317 or other applicable policies, as appropriate. Unless custody has been transferred to an appropriate federal agency or such agency has advised in writing that the records no longer need to be retained, records of research misconduct proceedings must be maintained in a secure manner for 7 years after completion of the proceeding or the completion of any federal proceeding involving the research misconduct allegation. The RIO is also responsible for providing any information, documentation, research records, evidence or clarification requested by ORI or other appropriate federal agency to carry out its review of an allegation of research misconduct or of the institution's handling of such an allegation.

IX. Completion of Cases; Reporting Premature Closures to Federal Agencies

Generally, all inquiries and investigations will be carried through to completion and all significant issues will be pursued diligently. A case may be closed at the inquiry stage if it is determined that an investigation is not warranted. A case may be closed at the investigation stage if there is a finding that no research misconduct was committed. If the alleged misconduct was in the jurisdiction of the ORI or other federal agency, then this finding must be reported to the applicable agency. An advance notification by the RIO to any applicable federal agency must be made if there are plans to close a case at the inquiry, investigation, or appeal stage on the basis that respondent has admitted guilt, a settlement with the respondent has been reached, or for any other reason except those noted above.

X. Institutional Administrative Actions

If the DO and any subsequent appeal determine that research misconduct is substantiated by the findings, then the DO will decide on the appropriate actions to be taken, after consultation with the RIO and the Chancellor. The administrative actions may include, but are not limited to, the following:

- Withdrawal or correction of all pending or published abstracts

and papers emanating from the research where research misconduct was found;

- Removal of the responsible person from the particular project, letter of reprimand, special monitoring of future work, probation, suspension, salary reduction, or initiation of steps leading to possible rank reduction or termination of employment;
- Restitution of funds to the grantor agency as appropriate; and
- Other action appropriate to the research misconduct.

XI. Other Considerations**A. Termination or Resignation Prior to Completing Inquiry or Investigation**

The termination of the respondent's institutional employment, by resignation or otherwise, before or after an allegation of possible research misconduct has been reported, will not preclude or terminate the research misconduct proceeding or otherwise limit any of the institution's responsibilities under 42 CFR Part 93 or the corresponding research misconduct policies of other federal agencies.

If the respondent, without admitting to the misconduct, elects to resign his or her position after the institution receives an allegation of research misconduct, the assessment of the allegation will proceed, as well as the inquiry and investigation, as appropriate based on the outcome of the preceding steps. If the respondent refuses to participate in the process after resignation, the RIO and any inquiry or investigation committee will use their best efforts to reach a conclusion concerning the allegations, noting in the report the respondent's failure to cooperate and its effect on the evidence.

B. Restoration of the Respondent's Reputation

Following a final finding of no research misconduct, including ORI concurrence where required by 42 CFR Part 93 or other federal agencies, if required, the RIO must, at the request of the respondent, undertake all reasonable and practical efforts to restore the respondent's reputation. Depending on the particular circumstances and the views of the respondent, the RIO should consider notifying those individuals aware of or involved in the investigation of the final outcome, publicizing the final outcome in any forum in which the allegation of research misconduct was previously publicized, and expunging all reference to the research misconduct allegation from the respondent's personnel file. Any institutional actions to restore the respondent's reputation should first be approved by the DO.

C. Protection of the Complainant, Witnesses and Committee Members

During the research misconduct proceeding and upon its completion, regardless of whether the institution or ORI determines that research misconduct occurred, the RIO must undertake all reasonable and practical efforts to protect the position and reputation of, or to counter potential or actual retaliation against, any complainant who made allegations of research misconduct in good faith and of any witnesses and committee members who cooperate in good faith with the research misconduct proceeding. The DO will determine, after consulting with the RIO, and with the complainant, witnesses, or committee members, respectively, what steps, if any, are needed to restore their respective positions or reputations or to counter potential or actual retaliation against them. The RIO is responsible for implementing any steps the DO approves.

D. Allegations Not Made in Good Faith

If relevant, the DO will determine whether the complainant's allegations of research misconduct were made in good faith, or

whether a witness or committee member acted in good faith. If the DO determines that there was an absence of good faith he/she will determine whether any administrative action should be taken against the person who failed to act in good faith.

Appendix

A. Summary of Items that must be Reported or Submitted to the ORI in those Cases Covered by 42 CFR Part 93

(Note: This list is subject to modification based on adherence to current ORI regulations.)

- An annual report containing the information specified by ORI on the institution's compliance with the final rule. Section 93.302(b).
 - Within 30 days of finding that an investigation is warranted, the written finding of the responsible official and a copy of the inquiry report. Sections 93.304(d), 93.309(a), and 93.310(a) and (b).
 - Where the institution has found that an investigation is warranted, the institution must provide to ORI upon request: (1) the institutional policies and procedures under which the inquiry was conducted; (2) the research records and evidence reviewed, transcripts or recordings of any interviews, and copies of all relevant documents; and (3) the charges for the investigation to consider. Section 93.309.
 - Periodic progress reports, if ORI grants an extension of the time limits on investigations or appeals and directs that such reports be submitted. Sections 93.311(c) and 93.314(c).
 - Following completion of the investigation report or any appeal: (1) a copy of the investigation report with all attachments and any appeals; (2) the findings of research misconduct, including who committed the misconduct; (3) a statement of whether the institution accepts the findings of the investigation; and (4) a description of any pending or completed administrative actions against the respondent. Section 93.315.
 - Upon request, custody or copies of records relevant to the research misconduct allegation, including research records and evidence. Section 93.317(c).
 - Notify ORI immediately of the existence of any of the special circumstances specified in Section 93.318.
 - Any information, documentation, research records, evidence or clarification requested by ORI to carry out its review of an allegation of research misconduct or the institution's handling of such an allegation. Section 93.400(b).
- B. Outline for an Inquiry/Investigation Report for ORI

(Note: A recommended outline for inquiry and investigation reports has been furnished by ORI and is available on the Research Support and Sponsored Programs web site. Committee members should consult this outline in preparing reports. The outline is subject to modification based on adherence to current ORI regulations.)

C. Conflict of Interest Statement

(Note: A sample conflict of interest statement is available on the Research Support and Sponsored Programs web site. This statement shall be provided to the RIO for use in implementing the conflict of interest portions of this policy.)

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 ad-

resses 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 be dealt with as a violation of the academic integrity policy.

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 Integrity Policy for Graduate Students*, and the *Research and Scholarly Misconduct Policies and Procedures* 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 integrity. 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. Students who receive two consecutive unsatisfactory academic progress reports may be immediately dismissed by the degree program and the Graduate School.

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 "University of Arkansas Academic Integrity Policy," 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. The student's degree program may request that the academic warning period be extended if the program can offer extenuating circumstances as a rationale and is willing to provide a plan of remediation for the student's success.

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 INTEGRITY

I. Preamble:

As a community of scholars, we uphold academic integrity and our Honor Statement as foundational to appropriate conduct within the university setting. The fundamental trust that work presented as one's own truly represents one's own intellect and effort underlies our mission as an educational, research and service institution; moreover, this trust is central to our peers' recognition of the value of a University of Arkansas degree. Thus, this document represents a deeply- and commonly-held set of values. Because this trust is so essential to the enterprise of the University of Arkansas, this policy has been established to set forth the University's commitment to academic integrity and to create procedures to address allegations of academic misconduct in a fair and unified manner.

Responsibility for understanding and adhering to the values of academic integrity, including being familiar with and complying with this policy, lies with individual students as members of the University community. The University shall assist students in meeting this responsibility through educa-

tional efforts such as training held during both undergraduate and graduate new student orientation, and on-line training modules, and may also include training during program-level orientation and in individual classrooms. The University shall also provide a statement on academic integrity that faculty will be encouraged to include in all course syllabi. Again, however, as developing scholars, students must take the initiative to familiarize themselves with and clarify expectations regarding academic integrity.

II. Definitions:

Academic Dishonesty: Academic dishonesty involves acts that may subvert or compromise the integrity of the educational or research process at the University of Arkansas, when such acts have been performed by a UA student. Academic dishonesty includes, but is not limited to, any act by which a student gains or attempts to gain an academic advantage for him/herself or another by misrepresenting his/her or another's work or by interfering with the independent completion, submission, or evaluation of academic work. Academic dishonesty may include those acts defined as research or scholarly misconduct; such academic integrity issues are subject to review under this policy as well as under the University's Research and Scholarly Misconduct Policy. Which policy applies to particular allegations is addressed in more detail below; if necessary, the Research Integrity Officer, in consultation with the student's dean, shall determine which policy is most appropriate for a given case.

Academic Integrity Monitor: In each college/school, one or more Associate Deans will be designated by the Dean, subject to approval by the Provost, as the Academic Integrity Monitor(s). The Academic Integrity Monitor shall be responsible to conduct an initial review of allegations of academic dishonesty at the college/school level to determine whether there is sufficient evidence of a violation for the matter to be considered by the All-University Academic Integrity Board (Board or AUAIB), as defined below. When a student admits responsibility for an infraction, the Academic Integrity Monitor recommends a sanction to the Board, based on the Sanction Rubric. The Academic Integrity Monitor is the School or College's liaison to the Board, and will have primary responsibility for presenting a case to the Board when necessary. If the Academic Integrity Monitor determines the evidence is not sufficient for consideration by the Board, the case will be dismissed unless the instructor (with the support of the Chair) appeals the Monitor's determination to the Board.

All-University Academic Integrity Board (Board or AUAIB): The Board is responsible for reviewing contested allegations of academic dishonesty and contested sanctions referred by the Academic Integrity Monitor. The Board is responsible for making sure that any finding of responsibility for academic misconduct is supported by a preponderance of the evidence and for imposing sanctions consistent with the Sanctions Rubric when a student is found responsible for a violation. The Board is responsible for ensuring that academic integrity sanctions are applied in a consistent manner. Ordinarily, in making its determinations, the Board will not take student intent into account, but instead will focus primarily on the actions of those involved. The Board reviews and makes a determination on all cases in which 1) students are contesting their responsibility (or instructors, with the support of the Department chair, are contesting findings that students are not responsible) for alleged infractions or 2) students are contesting sanctions. In addition, in cases where the student accepts responsibility and does not contest sanctions, the Board reviews sanctions recommended by the Academic Integrity Monitor and imposes sanctions consistent with the Sanctions Rubric. When reviewing cases, the Board may request further information and require participation in a hearing by the instructor and/or students (if deemed appropriate by the Board).

The Board is composed of six faculty or instructional staff (one from each undergraduate academic college), one faculty representative of the library, one representative of the Graduate School or Honors College, and two students (one graduate and one undergraduate). In order to facilitate timely review of cases, there will be two such committees constituted each year and each of these committees will meet one time per month. The committees will elect

their own chair. The Director of OAISC will be an ex officio member of the AUAIB. (Note: The School of Law has its own academic integrity process.) There will also be a pool of trained alternates who can sit on the Board in the event that a member is unable to attend a hearing due to a schedule conflict, illness, conflict of interest, or the like. A third committee, which may be comprised of members of the other two committees, will meet during the summer.

Complete Written Record: The complete written record for each case refers to all relevant documents submitted by the student as well as a University representative as evidence related to the allegations of academic dishonesty. The complete written record is initially compiled by the Academic Integrity Monitor but subsequently is forwarded to and maintained by, and may be added to, by the Office of Academic Integrity and Student Conduct.

Jurisdiction: The Academic Integrity Monitor is responsible for the initial review of all undergraduate cases involving work in courses taken in his/her college. The Academic Integrity Monitor is also responsible for initial review of all cases involving allegations of academic dishonesty in other academic work (with the exception of those cases reviewed under the Research Misconduct Policy), when the faculty member who has oversight responsibility for that student (e.g. major professor, faculty collaborator, honors advisor, advisor) resides within the college. When a student is majoring in a program outside the college in which an academic integrity matter arises, the Academic Integrity Monitor of the other college should be kept informed about the case and its resolution. The Academic Integrity Monitor in the Graduate School is responsible for all cases of alleged academic dishonesty involving graduate students (including, without limitation, all allegations relating to course work or work outside a class), with the exception of those cases which fall under the jurisdiction of the Research Misconduct Policy.

Office of Academic Integrity and Student Conduct (OAISC) (formerly Office of Community Standards and Student Ethics): Housed in the Office of the Provost/Vice Chancellor for Academic Affairs, this is the University-level office tasked with processing academic misconduct cases that are sent forward from the colleges. This Office is responsible for reporting back to the academic colleges, the Provost, and the Faculty Senate, consistent with the requirements of the Family Educational Rights and Privacy Act (FERPA), an annual total of cases heard and their outcomes, as well as the general basis for the decisions made. This Office is the repository of all records pertaining to academic integrity cases across campus.

Preponderance of Evidence: The standard of proof in a case arising under the Academic Integrity Policy shall be the "preponderance of the evidence." A "preponderance of the evidence" shall mean evidence which is of greater weight or more convincing than evidence to the contrary; evidence which shows that something more likely than not is true.

Reporting: Following initial compilation by the Academic Integrity Monitor, all records will be kept in OAISC. A final report summary for each case will be forwarded to the college Academic Integrity Monitor, to the department chair/head, and to the instructor. Annual summary reports (with no details with respect to specific faculty or students) will be reported to the Colleges and to the Faculty Senate.

Sanction Rubric: Sanctions associated with various levels of academic misconduct, approved by the Faculty Senate and applicable to all student academic work at the University of Arkansas. All sanctions will be imposed by the AUAIB.

Academic Honesty Syllabus Statement: Faculty are encouraged to include this statement on their syllabus:

"As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail."

“Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ which may be found at <http://provost.uark.edu/> Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.”

Student: An undergraduate student is one who is enrolled at the University of Arkansas during the semester of the infraction in a baccalaureate degree program or in an undergraduate non-degree-seeking status. A graduate student is one who has been admitted to the Graduate School and need not be enrolled to be considered a student under this policy.

Work for a course: “Work for a course” consists of any work undertaken or submitted towards the fulfillment of the requirements of a course (whether graded or not), including, but not limited to, exams, quizzes, papers, essays, homework assignments, artwork, designs, programs, and other projects or assignments.

Work outside of a course: “Work outside a course” consists of student work, other than work for a course, undertaken or submitted towards the fulfillment of the requirements of a degree or program, including, but not limited to, candidacy or comprehensive exams, dissertations, honors theses, master’s theses, work done for funded research projects, reports submitted to a funding agency or material submitted for publication in a scholarly journal.

Working Days: Working days shall refer to Monday through Friday, excluding official University holidays or days that the University is closed due to exigent circumstances such as weather. For periods of five days or less, University breaks shall also be excluded.

III. Procedures:

A. Infractions Involving Work for a Course at the Undergraduate or Graduate Level

1. Reports of Suspected Academic Dishonesty. When an instructor/department initially suspects that a student has violated the Academic Integrity Policy, the instructor or another appropriate University official may discuss the matter with the student and/or with the Academic Integrity Monitor for the college or school. Should the instructor/department determine that the student may be responsible for academic dishonesty, the instructor or another appropriate University official will, within five working days after determining that there is a potential violation of the Academic Integrity Policy (or as soon as practicable thereafter), report the case to the Academic Integrity Monitor for the college. In reporting the case, the instructor/official will submit a completed “Allegation Evidence Form,” available on the OAISC website, to help ensure that all information necessary to the consideration of the case is available for review.

2. The Academic Integrity Monitor. The Academic Integrity Monitor will review the case and meet with the instructor to gather any relevant information relating to any alleged violations of the Academic Integrity Policy. The Academic Integrity Monitor shall meet separately with the student to notify the student of the alleged violations of the Academic Integrity Policy, disclose to the student any evidence to be used against him or her, and gather information from the student about the matter. The Monitor will have access to any previous academic integrity-related records for the student from the OAISC and may review pertinent records or speak with other individuals with knowledge about the matter. Information compiled by the Academic Integrity Monitor may be added to the written record. After conducting this review the Academic Integrity Monitor may proceed as follows:

a. The Academic Integrity Monitor may determine that

the evidence of an alleged violation is insufficient to warrant forwarding the case to the Board. In this case, the Academic Integrity Monitor will notify the instructor/Department and student of his/her determination. The complete written record of the Academic Integrity Monitor’s determination will be forwarded to the OAISC, and a summary of the matter shall be provided to the AUAIB for its information.

i. If the Instructor, with the support of the Department/program chair/head/director, disagrees with the determination of the Academic Integrity Monitor, the instructor’s position shall be reported to the AUAIB for consideration by the Board.

b. Alternatively, the Academic Integrity Monitor may determine **there is sufficient evidence of a violation to forward the matter to the Board for its consideration**, in which case the following may occur:

i. The student accepts responsibility for the infraction: In this case, the Academic Integrity Monitor shall inform the student of the potential consequences of the action. The Academic Integrity Monitor completes the file and recommends the appropriate sanction for consideration by the AUAIB consistent with the Sanction Rubric, makes a record of the case which is forwarded to the OAISC and AUAIB, and reports back to the Department/program and instructor.

ii. The student contests responsibility for the infraction: In this case, the Academic Integrity Monitor will forward the case together with the evidence to OAISC and AUAIB. Within five working days from receipt of the Allegation Evidence Form (or as soon thereafter as practicable), a representative from OAISC will contact the student and arrange a meeting during which the process and possible outcomes are explained to the student. As part of the complete written record, the student will be provided with an opportunity to submit a written statement responding to the allegations and explaining why he/she did not commit the alleged infraction. Ordinarily, the student will not provide a statement pertaining to intent, unless it materially affects the question of whether the student committed a violation of the Academic Integrity Policy.

iii. The student contests the sanctions: If the student 1) accepts responsibility but disagrees with the Academic Integrity Monitor’s sanction recommendation, or 2) contests responsibility and sanctions, the student will be provided an opportunity to submit a written statement explaining the student’s position on sanctions and proposing alternatives. If the proposed sanction is based on the sanction rubric, the statement must address how the rubric has been applied incorrectly in the student’s case.

3. Standard of Evidence. The standard used in reviewing whether a violation of the Academic Integrity Policy has occurred under this policy shall be the preponderance of the evidence.

4. Continued Participation. To the extent practical, during the consideration of a case, the student’s participation in the affected class should continue in order to minimize the impact on the student if he or she is not determined to be responsible for an alleged infraction.

B. Infractions Involving Work Outside a Course at the Under-

graduate or Graduate Level: Cases of alleged academic misconduct occurring outside a course, as defined previously, may be subject to review under this policy as well as under the University's Research and Scholarly Misconduct Policy. Which policy applies to particular allegations is determined by the Research Integrity Officer and the student's dean. Except when a matter is determined to be properly considered under the Research and Scholarly Misconduct Policy, rather than this policy, when a supervising faculty member or other appropriate University official determines that a student may be responsible for academic dishonesty in a situation involving work outside a course, the procedures outlined in this policy shall be followed.

C. The All-University Academic Integrity Board

1. Based on the record filed, including the Allegation Evidence Form, the AUAIB shall determine responsibility (if necessary) and impose the appropriate sanction. In addition, with notice to the student, the Board may request additional evidence, require students, the instructor, or other appropriate University officials to be present at a hearing and/or refer the matter back to the Academic Integrity Monitor for further consideration. Ordinarily, a student will meet with the Board only if the Board so requests it, having already met with the Academic Integrity Monitor and provided his/her written statement for the Board. However, if the student is facing a possible sanction of suspension or expulsion, or loss of a scholarship, he/she shall be permitted to meet with the Board and present witnesses and evidence, if the student desires. If a student is not facing possible suspension, expulsion or loss of a scholarship, and the student requests a meeting, the Board shall designate one of its members to meet with the student prior to the Board's consideration of the case. If a member meets with the student, the member shall participate in the Board's consideration of the alleged infractions.
2. In the case where a student and the instructor or other University official reporting the alleged infraction are requested to appear at a Board hearing, each must have at least ten working days' notice of the hearing, unless both agree to waive this requirement. If any material is added to the Complete Written Record, the student shall have at least three business days prior to the Board hearing to review the information. The student, the instructor or other appropriate University official, and the Academic Integrity Monitor for the case, who will have primary responsibility to present the infractions, will attend the Board meeting. Generally these individuals will be the only persons in attendance, other than the Board and OAISC staff. The Board may question any of these individuals. The instructor will not ordinarily be asked to make a statement, but may be asked questions by the Board. The Board shall review the complete record of the case to determine whether a preponderance of the evidence exists to find a violation of the Academic Integrity Policy and if so, impose a sanction consistent with the Rubric. Because the focus of the hearing is generally not on intent, other witnesses will typically not be called unless the Board determines that the witnesses can address whether the student committed the alleged infraction.
3. When sanctions are imposed, the letter outlining the sanctions will be signed by the Chair on behalf of the Board and by the Director of OAISC and sent to the student and the instructor, with a copy to the Academic Integrity Monitor.

D. Appeals. Students (or the instructor, with the support of the

Department Chair) may appeal a determination by the AUAIB to the Provost and Chancellor, but only when the appeals are based on the following grounds: (1) a procedural error occurred; (2) an objective assessment of the evidence under the preponderance of evidence standard does not support a finding of responsibility; (3) new and significant evidence has been identified since the Board hearing; (4) the sanctions are inconsistent with the Sanction Rubric; or (5) that additional sanctions imposed are excessive. To effect an appeal, the student (or instructor/department), within five working days of transmittal of the decision of the AUAIB to the student (or instructor/department), shall request that the Provost and Chancellor review the case, using the "Appeal Form" found on the website of the OAISC. The transmittal of the decision by the AUAIB shall expressly state that the student (or instructor/department) shall have five days to appeal the decision. The Provost and Chancellor shall attempt to review and resolve all appeals within thirty days or as soon as possible thereafter after receiving the Appeal Form. If the Provost and Chancellor determine that a procedural error occurred, that an objective assessment of the evidence does not support a finding of responsibility, that new evidence warrants a rehearing, that an inconsistency in sanction has occurred, or that additional sanctions are excessive in nature, the Provost and Chancellor may decide the matter or may refer the case back to the same or to another AUAIB for further action. If a new hearing is held, the case may be appealed to the Provost and Chancellor using the procedure outlined above, in which case their determination on the matter shall be final.

E. Procedural Changes. Particular circumstances in an individual case may dictate variation from the procedures set out in this policy in order to ensure fair and efficient consideration of the matter. Any change in the procedures must ensure fair treatment of the student. Any major deviations from the procedures described in this policy shall be made only with the written approval of the Provost.

ACADEMIC INTEGRITY SANCTION RUBRIC

I. Violation Levels

The following violation levels are assigned to specific types of violations of the University's Academic Integrity Policy; if a violation of academic integrity principles occurs which is not specifically provided for below, then any sanctions will be based on the most similar type of violation that exists in the rubric. A violation will be considered as a single violation up until the point that a student receives notice of that violation; additional infractions occurring after that point will be considered separately for purposes of this rubric.

A student receives the assigned number of sanction points for each violation for which he/she is found responsible. Sanction points are cumulative over the length of the student's tenure at the University of Arkansas.

Level One Violation – 0.5 sanction point for each violation

- Copying from or viewing another student's work during an examination.
- Using any materials or resources that are not authorized by the instructor for use during an examination.
- Collaborating during an examination with any other person by giving or receiving information without specific permission of the instructor.
- Facilitating or aiding in any act of academic dishonesty.
- Collaborating on laboratory work, take-home examinations, homework, or other assigned work when instructed to work independently.

- Submitting, without specific permission of the instructor, work that has been previously offered by the same student for credit in another course.
- Falsification of attendance and/or participation.
- 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 (undergraduate level).

Level Two Violation – 1.0 sanction point for each violation

- Buying, selling or otherwise obtaining or providing information about an examination not yet administered.
- 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, speech, painting, drawing, sculpture, or other written or creative work or project of any nature prepared totally or in large measure by another.
- Submitting altered or falsified data (undergraduate level).
- Plagiarizing (graduate level).

Level Three Violation – 3.0 sanction points for each violation

- Altering grades or official records.
- Falsifying or signing another person's name on any academically-related University form or document.
- Sabotaging another student's work.
- Submitting altered or falsified data (graduate level)

II. Sanctions

Sanction points = 0.5: For work for a course, the instructor shall give the test or an assignment an immediate zero (0) which shall then be averaged into the course grade. If the violation occurred on work outside of a course, the faculty member will require that the work be redone. If that involves missing a stated deadline, the stated late penalty will apply.

Sanction points = 1.0: The student will receive a course grade of XF for work done for a course ; for work outside a course, the student will receive a failure on the project (e.g. on the candidacy exam).

For infractions involving point levels of 1.5 and above, the course grade/project failure sanction will apply in addition to suspension or expulsion.

Sanction points = 1.5: The student will be suspended for the following semester (the student will be allowed to complete the current semester).

Sanction points = 2.0: The student will be suspended for two full semesters (the student will be allowed to complete the current semester).

Sanction points = 2.5: The student will be suspended for three full semesters (the student will be allowed to complete the current semester).

Sanction points = 3.0 or more. The student will be immediately and permanently expelled.

Note: For offenses not specifically mentioned in this rubric, faculty members may confer with the Academic Integrity Monitor and propose a description of the offense and the level of sanction to be included in the faculty member's syllabus. The proposed description and sanctions will be forwarded to the Academic Integrity Monitor to review the proposed offense and sanction for consistency with existing offenses and sanctions. If a faculty member and Academic Integrity monitor disagree over a particular offense or sanction, the matter may be discussed with the relevant dean and /or the AUAIB, but

must be reported to the AUAIB. In the event of a conflict between a syllabus and the Academic Integrity Policy or this rubric, the policy and rubric shall take precedence.

III. Course Retake Opportunities and Notation Removal

After two semesters of acceptable performance at the University following the imposition of a penalty, with no student conduct or academic dishonesty infractions and a minimum grade point of 2.0 (undergraduate) and 2.85 (graduate) in graded courses, the student may petition the Office of Academic Integrity and Student Conduct for an opportunity to retake a class failed due to academic dishonesty and have the grade changed (for graded work), for a first offense of any Level One or Level Two violation, or a second offense of a Level One violation.

Upon graduation or completion of the period of suspension, the student may request that the X, or notation of the student's suspension, be removed from the student's transcript, by submitting a written request to the Provost/Vice Chancellor for Academic Affairs. Expulsion from the University of Arkansas for academic dishonesty shall be permanently noted on the student's transcript.

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. If a student receives two consecutive reviews indicating that the student is not making adequate academic progress, the program and the Graduate School have the option to dismiss the student.

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 may be required to 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. Also, a request for leave of absence may not be made for the semester in which the student graduates.

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 date of the first courses used to fulfill requirements for the degree and doctoral students complete the degree within seven consecutive calendar years from the semester in which the student was first admitted to the program. 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.
3. Requests for time extension are allowed only for course work taken at the University of Arkansas (Fayetteville). We do not allow time extensions on transfer credit.

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 and that the content of that course is still current. 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 only that the content of the course has not changed in the time since the student was enrolled, as the student's knowledge of that content is also critical. Courses taken more than 10 years prior to the conferral of the degree will normally not be eligible for recertification.

ADMINISTRATIVE REQUIREMENT FOR GRADUATION

Application for graduation must be completed in the Graduate Dean's office, filed with the Registrar and fees paid by the appropriate deadline in 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. It will not be possible for a student to be cleared to graduate for a previous semester.

Students should be aware that FERPA restrictions on disclosing personally identifiable information may prevent their names being printed in the commencement program and/or being engraved on the sidewalk. Students can change their privacy settings in ISIS at the Student Center pages. Questions about this should be directed to the Office of the Registrar.

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 Athletic Training
- 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 Social Work

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 and may use up to six hours of course work taken at another accredited university to meet certificate requirements, with approval of the program faculty and the Graduate School. The Graduate School does not impose a limit on the number of hours that may be shared between graduate certificate programs, but a limit may be set by the program. 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)
- Arkansas Curriculum/Program Administrator (Curriculum and Instruction)
- Autism Spectrum Disorders (Curriculum and Instruction)
- Building-Level Administration (Curriculum and Instruction)
- District-Level Administration (Curriculum and Instruction)
- Educational Measurement (Educational Statistics and Research Methods)
- Educational Program Evaluation (Educational Statistics and Research Methods)
- Educational Psychology (Educational Statistics and Research Methods)
- Educational Statistics and Research Methods (Educational Statistics and Research Methods)
- Enterprise Systems (Graduate School of Business)
- Entrepreneurship (Graduate School of Business)
- Preparing for the Professoriate (Interdisciplinary)
- STEM Education for Early Childhood (Curriculum and Instruction)
- Sustainability (Interdisciplinary)

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 – and Master of Fine Arts. Program requirements may be higher. 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 minimum cumulative grade-point average of 2.85. (Individual departments may have higher grade standards.)
 4. Minimum residence of 24 weeks. (See Residence 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 value. 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. No more than six hours of special problems (individual study) courses may count toward a 30 hour master's degree.

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.

Students wishing to take 4000-level undergraduate courses for graduate credit will find the necessary forms on the Graduate School Web site at <http://www.uark.edu/grad/>. 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.

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 as part of the master's program, provided that the grades are "B" or better, the courses were taken within six years previous to the conferral of the current degree, and the subjects are acceptable to the program concerned. (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.

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 have been a bona fide graduate level course, approved for graduate credit and taught by a member of the graduate faculty.
3. 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.
4. The course must appear on an official transcript as graduate credit from the institution offering the course.
5. The course grade must be a "B" or "A." (The student's grade-point average is NOT to include grades on transfer courses.)
6. The course must be recommended by the student's major adviser and be applicable to the degree requirement at the University of Arkansas.
7. The course must not have been taken by correspondence or for extension credit.
8. The course must be acceptable to the department concerned and to the Graduate Dean.
9. 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.)
10. The course must have been taken within the time limit of the student's program at the University of Arkansas.
11. 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.

Ex Officio Committee Members: Student committees may contain *ex officio* members who have graduate faculty status on the University of Arkansas campus. However, when a person does not hold graduate faculty status on the University of Arkansas campus, he/she may still be allowed to hold an *ex officio* position on a student's committee, in accordance with the following policy: When a committee member does not hold graduate faculty status at the University of Arkansas, he/she will be allowed to serve on a student's master's thesis or doctoral dissertation committee, in addition to the minimum number of members required by the Graduate School or the department/program. The *ex officio* member will be allowed to sign the thesis or dissertation and his/her vote will be recorded but will not be binding for conferring the degree. This use of the term *ex officio* will indicate that the person does not hold graduate faculty status at the University of Arkansas and is serving in an honorary role.

Conflict of Interest Policies for Graduate Committees: Students should be aware that the Graduate School has policies pertaining to the composition of advisory and thesis committees. These may be found in the Graduate Student Handbook on the Graduate School website.

Residence Requirements. The candidate must present a minimum of 24 weeks of 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 weeks of course hours taken on the University of Arkansas, Fayetteville, campus or through approved University of Arkansas, Fayetteville, distance courses.

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 comprehensive 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 in time for the student to defend the thesis and submit it to the Graduate School by the posted deadline date. In the situation when there is a split decision among committee members of a master's program advisory or thesis committee, majority rules. For instructions on submitting an approved thesis, students should consult the Graduate School's Guide to Preparing Theses and Dissertations. Students will be required to submit their theses to University Microfilms Incorporated (UMI/ProQuest). There will be an additional charge for this submission.

Comprehensive Examination/Thesis Defense. 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. If a committee member does not participate in the final oral defense, that person will be asked by the Graduate School to resign from the committee. 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.

Students may elect to participate by distance through electronic means in their final oral defense of the thesis, if approved by the thesis faculty director. In advance of the final oral defense, the student must provide to the Graduate School a written, signed statement that he/she has elected this option.

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. Students should also be aware that they may not use for degree credit any course in which they received a grade of D or F. 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.

Sharing Courses Between Two Degrees. When a student earns two master's degrees, no more than six hours of course work may be used to satisfy the requirements of both degrees, i.e. shared between the degrees. This rule pertains whether the course work is taken on the University of Arkansas campus or is transferred from another university.

MASTER OF ACCOUNTANCY

See the Graduate School of Business, page 180.

MASTER OF ARTS IN TEACHING

The Master of Arts in Teaching (M.A.T.) degree is the initial certification program for students at the University of Arkansas and has two areas of emphasis: childhood education and secondary education. The M.A.T. is a 33 semester-hour degree offered to a cohort of students in consecutive summer, fall, and spring semesters with initial enrollment in the summer semester.

Admission Requirements: 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 3.0 in all previous courses; admission to the Graduate School; admission to a 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; successful completion of the required criminal background check; and payment of an internship fee. (Note: Background check materials must be submitted by May 1 prior to the student teaching/internship school year.)

Program Requirements: 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 successfully complete 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. Students may not present for degree credit any course in which they earned a grade of D or F.

For information on the areas of specialization, refer to the sections of this catalog on childhood education and secondary education in the Department of Curriculum and Instruction.

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 Arkansas 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.

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. Those interested in seeking an additional license or endorsement should contact the Coordinator of Teacher Education at G-22 Stone House South, 479-575-6740, or the Arkansas Department of Education, 501-682-4342 for licensure information.

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:

- Art Education – B.F.A.
- Career and Technical Education – B.S.E.
- Elementary Education – B.S.E.
- Human Environmental Sciences Education – B.S.H.E.S.
- Kinesiology P-12 – B.S.E.
- Middle Level Education – B.S.E.
- Music Education – B.M.
- Secondary Education – B.A., B.S.

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, G-22 Stone House South. 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 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 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

Programs of advanced study leading to the degree of Master of Education (M.Ed.) are offered in adult and lifelong learning, educational leadership, educational technology, elementary education, higher education, physical education, recreation and sport management, secondary education, special education, and human resource and workforce development education.

Program Requirements: 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 (portfolio in educational technology).
3. A cumulative grade-point average of 3.00.
4. A minimum of 24 graded UA course hours.

Admission Requirement: After a student has been admitted to the Graduate School, the student may seek acceptance into one of the M.Ed. programs. Upon acceptance to a program area, the student is assigned an adviser. Acceptance in a program 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 Examination, the Miller Analogies Test, or the National Teacher Examination.

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 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 44.)

Residence Requirements. The candidate must be present a minimum of 24 graded course hours taken in residence at the University of Arkansas, Fayetteville. Acceptance of transferred credit does not reduce the minimum residence requirement of 24 course hours taken on the University of Arkansas, Fayetteville, campus or through approved University of Arkansas, Fayetteville, distance courses.

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 (portfolio for educational technology).

MASTER OF FINE ARTS (IN ART)

See Art, page 60.

MASTER OF FINE ARTS (IN CREATIVE WRITING)

See Creative Writing, page 81.

MASTER OF FINE ARTS (IN DRAMA)

See Drama, page 92.

Other Requirements for M.F.A. 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 189.

MASTER OF PUBLIC SERVICE

See the Clinton School of Public Service, page 75.

MASTER OF SCIENCE IN NURSING

See Nursing, page 136.

MASTER OF SOCIAL WORK

See Social Work, page 159.

EDUCATIONAL SPECIALIST DEGREE

The Educational Specialist degree (Ed.S.) has two areas of specialization – curriculum and instruction, and educational leadership – 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 leadership 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 report 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.

The last 30 hours of the program must be completed within a period of six years from the first semester of admission to the program. 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 educational leadership; 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 leadership.

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.

DOCTORS OF PHILOSOPHY (PH.D.) AND EDUCATION (ED.D.)

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, community health promotion, comparative literature and cultural studies, computer science, counselor education, crop, soil, and environmental sciences, curriculum & instruction, economics, engineering, education policy, educational statistics and research methods, English, entomology, environmental dynamics, food science, geosciences, 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.)

Programs of advanced study leading to the degree of Doctor of Education (Ed.D.) are offered in adult and lifelong learning, educational leadership, higher education, recreation and sport management, and human resource and workforce development education.

The degrees of Doctor of Philosophy and Doctor of Education are 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.

Students who wish to become candidates for the degree of Doctor of Philosophy or Doctor of Education are expected to complete work equivalent to the requirements for the master's degree as determined by program faculty and must apply to be admitted to the Graduate School and the specific program of study. A student cannot satisfy any part of the residence requirement for the doctoral degree until after he/she has been officially admitted to the doctoral degree program.

Immediately after admission to the program, with the approval of the Dean of the Graduate School, a Doctoral Program Advisory Committee will be appointed from the graduate faculty to evaluate the student's preparation and fitness for further graduate work. 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 or Doctor of Education, 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 first semester of admission to the program.

Program of Study. The objectives of the program of study leading to the degree of Doctor of Philosophy or Doctor of Education 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.

Ex Officio Committee Members: Student committees may contain ex officio members who have graduate faculty status on the University of Arkansas campus. However, when a person does not hold graduate faculty status on the University of Arkansas campus, he/she may still be allowed to hold an ex officio position on a student's committee, in accordance with the following policy:

When a committee member does not hold graduate faculty status at the

University of Arkansas, he/she will be allowed to serve on a student's master's thesis or doctoral dissertation committee, in addition to the minimum number of members required by the Graduate School or the department/program. The ex officio member will be allowed to sign the thesis or dissertation and his/her vote will be recorded but will not be binding for conferring the degree. This use of the term ex officio will indicate that the person does not hold graduate faculty status at the University of Arkansas and is serving in an honorary role.

Conflict of Interest Policies for Graduate Committees: Students should be aware that the Graduate School has policies pertaining to the composition of advisory and dissertation committees. These may be found in the Graduate Student Handbook on the Graduate School website.

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 or Doctor of Education 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 or Doctor of Education degree was 2.85. Students should also be aware that they may not present for degree credit any course in which they earned a grade of D or F.

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. The Doctor of Education degree does not have a foreign language requirement.

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 program/department in which the candidate is working. These examinations may be either written or written and oral, but the expectation is that their purpose is to determine if a student is prepared to move to the independent research stage of his/her degree. 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. The Graduate School should be notified within two weeks of the student being admitted to candidacy. 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 graduate course work or 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.

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 (or graded course work) 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. Before the final degree is conferred, registration will be assessed for each semester in which a student fails to register without prior approval of the Dean of the Graduate School.

The dissertation must be submitted for approval to the dissertation 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 dissertation in time for the student to defend the dissertation and submit it to the Graduate School by the posted deadline date. For instructions on submitting an approved dissertation, students should consult the Graduate School's Guide to Preparing Theses and Dissertations. Students will be required to submit their dissertations to University Microfilms Incorporated (UMI/ProQuest).

Final Examination. The candidate's final examination for the degree of Doctor of Philosophy or Doctor of Education will be oral. At least two weeks in advance, the major adviser will forward to the Dean of the Graduate School notification about the date, time and place of the final 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. This participation may be by distance. If they do not participate in the final oral defense, in person or by distance, they will be asked by the Graduate School to resign from the committee. 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.

Students may elect to participate by distance through electronic means in their final oral defense of the dissertation, if approved by the dissertation faculty director. In advance of the final oral defense, the student must provide to the Graduate School a written, signed statement that he/she has elected this option.

Split Decisions Within 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. A course starting with a 4 in this catalog is dual-listed as an undergraduate course; a course starting with a 5 is generally master's level work, and a course starting with a 6 is generally doctoral-level work.

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
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
ATTR	Athletic Training
BENG	Biological Engineering
BIOL	Biology
BLAW	Business Law
CATE	Career and Technical Education
CDIS	Communication Disorders
CEMB	Cell and Molecular Biology
CHEG	Chemical Engineering
CHEM	Chemistry
CHIN	Chinese
CHLP	Community Health Promotion
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
EDFD	Educational Foundations
EDLE	Educational Leadership
EDRE	Education Reform
ESRM	Educational Statistics and Research Methods
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
FREN	French
GEOG	Geography
GEOL	Geology
GEOS	Geosciences
GERM	German
GERO	Gerontology
GNEG	General Engineering
GREK	Greek
GRSD	Graduate School (Interdisciplinary)
HESC	Human Environmental Sciences
HHPR	Health, Human Performance and Recreation
HIED	Higher Education
HIST	History
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	Ethnomusicology
MUTH	Music Theory
NURS	Nursing
OMGT	Operations Management
PADM	Public Administration
PEAC	Physical Education (Activity)
PHED	Physical Education
PHIL	Philosophy
PHSC	Physical Science
PHYS	Physics
PLPA	Plant Pathology
PLSC	Political Science
POSC	Poultry Science

PSYC	Psychology
PTSC	Plant Science
PUBP	Public Policy
RESM	Recreation and Sport Management
RHAB	Rehabilitation Education
RSOC	Rural Sociology
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
WCOB	Business
WDED	Workforce Development Education
WLIT	World Literature
WLLC	World Languages, Literatures, and Cultures

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://grad.uark.edu/>.

Departments and Programs of Study

ACCOUNTING (ACCT)

See Graduate School of Business, page 180.

ADULT AND LIFELONG LEARNING

See Workforce Development Education in the Department of Rehabilitation, Human Resources, and Communication Disorders, page 157.

AGRICULTURAL AND EXTENSION EDUCATION (AEED)

George Wardlow
Department Head
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479-575-2035
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<http://aeed.uark.edu/6036.php>

- Professors Graham, Johnson, Miller, Wardlow
- Adjunct Professors Ballard, Poling
- Associate Professor Edgar (L.)
- Assistant Professor Edgar (D.)
- Instructor Cox

Degrees Conferred:
M.S. (AEED)

Areas of Study: Agricultural education, communication, technology, 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, with a choice of either a thesis or non-thesis option. Students in the thesis option complete a written thesis AGED 600V (six hours) and students in the non-thesis option complete a three-hour special problem, AGED 510V. There are 12 hours of core courses consisting of AGED 5463 Research Methodology in Social Sciences, AGED 5473 Interpreting Social Data in Agriculture, AGED 5483 Technical Communications in the Social Sciences, and AGED 5053, Philosophy of Agricultural Extension Education. The remaining hours (15 for the thesis option, 18 for the non-thesis option) may be taken in a technical

area in agricultural and extension education courses. The thesis will focus on a research problem that bridges agricultural education, communication, technology 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 Graphic Design in AFLS (Sp, Su) This course provides students with graphic design and software skills specific to industries in Agriculture, Food, and Life Sciences. Students will learn to use industry-standard software (InDesign, Photoshop, Illustrator, Microsoft Excel, etc.) to prepare text and graphics and package them for use in print production. Prerequisite: AGME 2903

AGED4343 Communication Campaigns in Agriculture (Even years, Fa) Students will develop understanding of the principles, practices and applications of social marketing, integrated marketing communications, advertising and public relations as they pertain to developing communication campaign strategies for the agricultural industry. Students will develop a communication campaign for an agricultural company and/or entity focused on a specific product or service. Prerequisite: Senior or Graduate status.

AGED4443 Principles of Technological Change (Odd years, Fa) This course introduces a structured approach for dealing with the organizational and human aspects of technology transition, including the key concepts of resistance and change management, organizational change, communications, and processes by which professional change agents influence the introduction, adoption, and diffusion of technological change. This course may be offered as a web-based course. Prerequisite: Junior status.

AGED4543 Ag Publications (Even years, Sp) Students produce a magazine through classroom study mirroring a professional magazine staff and are provided an opportunity for their writing, advertisements, photographs and artwork to be published in the magazine. By using computer applications, students integrate various skills including writing, editing and layout in agricultural publications. Prerequisite: JOUR 1033.

AGED4632 Teaching Diverse Populations in Agricultural and Extension Education (Sp) This course is designed to provide pre-service teachers of agriculture with an understanding of teaching diverse populations as applied to problems of practice in agricultural and extension education.

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 up to 6 hours of degree credit.

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 (Odd years, Su) Emphasis on shop organization and management, courses of study, unit shop instruction, and development of skills in agricultural mechanics.

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 (Even years, 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.

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 credit.

AGED5363 Educational Delivery Techniques (Irregular) Students will learn to apply teaching and learning theory in the development of engaging instruction delivered through electronic media. The goal of the course is not to make experts in "programming" or "theory", but rather to prepare students with the knowledge/practical skills necessary to deliver curriculum through various methods. Prerequisite: Graduate standing.

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 HESC 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).

AGED5483 Technical Communication in the Social Sciences (Odd years, Sp) This course will provide students with the basic principles and techniques in communicating social science information relevant to human subject research in agriculture, natural resources, and life sciences to the general public. Communication processes covered in the course include audience identification, writing, editing, and production of social science-based materials for popular and refereed publications. Focus will also be placed on thesis preparation and writing and research manuscript development and dissemination of social science research. Web delivered course. Prerequisite: Graduate standing.

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 (Irregular) 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 credit.

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 credit.

AGME4203 Mechanized Systems Management (Even years, 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: Math 1203.

AGME4973 Irrigation (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 2 hours per week. Corequisite: Lab component. Prerequisite: Math 1203.

AGRICULTURAL ECONOMICS AND AGRIBUSINESS (AEAB), DEPARTMENT OF

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- Professors Ahrends, Cochran, Dixon, Goodwin, Halbrook, Nayga, Popp (M.), Rainey (R.), Wailes
- Adjunct Professors Miller, Parsch
- Associate Professors McKenzie, Popp (J.), Rainey (D.), Thomsen, Watkins
- Assistant Professor Nalley
- Research Assistant Professor Pittman
- Adjunct Assistant Professor Durand-Morat

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 upper-level management; 3 semester hours of upper-level marketing.

Core Requirements (22 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
- AGEC 600V Master's Thesis (6 hours)
- AGEC 5011 Seminar

Controlled Electives (9 hours):

- Other graduate courses in Agricultural Economics
- Graduate courses in the Walton College of Business
- Other graduate courses

Other Requirements:

A minimum of 16 hours of Agricultural Economics.
 Maximum of 9 hours at the 4000 level.

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 upper-level management; 3 semester hours of upper-level marketing ; 3 semester hours of introductory accounting.

Core Requirements: (16 hours)

- AGEC 5403 Quantitative Methods for Agribusiness
- AGEC 5413 Agribusiness Strategy
- AGEC 5143 Financial Management in Agriculture, or
 AGEC 4143 Agricultural Finance, or
 AGEC 4313 Agricultural Business Management
- AGEC 5153 Economics of Public Policy, or
 AGEC 4613 Domestic and International Agricultural Policy, or
 AGEC 5133 Agricultural and Environmental Resource Economics
- AGEC 5303 Agricultural Marketing Theory, or
 AGEC 4303 Adv. Agricultural Marketing Management
- 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 adviser.

Controlled Electives (9 hours):

- AGEC 503V Internship in Agricultural Economics (1-3 hours)
- Other Graduate Courses in Agricultural Economics
- Graduate Courses in the Walton College of Business
- Other Graduate Courses

Other Requirements:

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

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

Note: Participation in this program includes University of Ghent (Belgium), and University of Arkansas (UA) students. Students may study either semester at the UA campus and the other semester at the University of Ghent in Belgium, West Europe. Classes for UA students taken at the University of Ghent are in English. The summer may be 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 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 upper-level management; 3 semester hours of upper-level marketing; and 3 semester hours of introductory accounting.

Core Requirements: (16 hours)

AGEC 5403 Quantitative Methods for Agribusiness
AGEC 5413 Agribusiness Strategy
AGEC 5143 Financial Management in Agriculture, or
AGEC 4143 Agricultural Finance, or
AGEC 4313 Agricultural Business Management
AGEC 5153 Economics of Public Policy, or
AGEC 4613 Domestic and International Agricultural Policy, or
AGEC 5135 Agricultural and Environmental Resource Economics
AGEC 5303 Agricultural Marketing Theory, or
AGEC 4303 Advanced Agricultural Marketing Management
AGEC 5011 Seminar

Agribusiness Management (University of Ghent Electives): (12 hours)

Equivalent of 12 semester hours from the following courses (4 courses):
AGEC 502(3) Agricultural & Food Economics
AGEC 502(3) Agricultural Sociological Perspectives of Rural Dev.
AGEC 502(3) Micro-economic Theory and Farm Management
AGEC 502(3) Rural Project Management
AGEC 502(3) Agricultural and Rural Policy
AGEC 502(3) Rural Development and Agriculture
AGEC 502(3) Development Economics
AGEC 502(3) Agricultural Economics of Developing Countries
AGEC 502(3) Advanced Marketing and Agribusiness Management
AGEC 502(3) Applied Rural Economic Research Methods
AGEC 502(3) Industrial Management
AGEC 502(3) Food Marketing and Consumer Behavior
AGEC 502(3) Economics and Management of Natural Resources

Controlled Electives (3 hours):

AGEC 503V Internship in Agricultural Economics (1-3 hours)
Other graduate courses in Agricultural Economics
Graduate courses in the Walton College of Business
Other graduate courses

Other Requirements:

Maximum of 9 hours at 4000 level
Minimum of 16 hours of Agricultural Economics

Requirements for the Master of Science Degree in Agricultural Economics (U.S.-E.U. Atlantis Double Degree in Agricultural Economics and Rural Development Concentration): Thesis (Minimum 31 hours)

Participation in this two-year program includes U.S. students from the

University of Arkansas and E.U. students from a consortium of five universities in Europe (University of Ghent, Ghent, Belgium; Humboldt University, Berlin, Germany; National Institute of Advanced Training and Research in Food and Agronomy, Rennes, France; University of Pisa, Pisa, Italy; and the Slovakian University of Nitra, Nitra, Slovakia). The program includes five academic terms (four semesters and one summer). U.S. students enroll for at least two terms at the University of Arkansas and for at least two terms at two E.U. universities in the European consortium. E.U. students enroll for at least two terms at two E.U. universities in the European consortium and at least two terms at the University of Arkansas. Study in both the U.S. and E.U. includes three semesters of graduate coursework, completion of a case study or internship during the summer, and one semester of joint thesis research supervised by U.S. and E.U. faculty. All coursework is in English in both the U.S. and E.U. Class enrollment for all students remains at their home university. University of Arkansas students earn credit for AGEC 502V Special Topics for courses taken at E.U. universities. Upon successful completion of the program, students receive an M.S. degree in agricultural economics from the University of Arkansas, and an M.S. degree in rural development from the consortium of E.U. universities.

Prerequisites to the Atlantis Concentration: Six hours of mathematics (college algebra or above); 3 hours of statistics; 3 hours of economic principles; and 6 hours of courses in agricultural economics, rural development, social sciences, or agriculture and agribusiness-related courses.

Core Requirements: (16 hours)

Coursework from each of the following areas: quantitative analysis or research methods; management or marketing; policy or analysis of public sector issues; 6 hours of master's thesis; and AGEC 5011 seminar.

Controlled Electives: (15 hours)

Other graduate courses in Agricultural Economics
Other graduate courses approved by the student's advisory committee

Other Requirements:

Minimum of 16 hours in Agricultural Economics
Maximum of 15 hours of transfer courses from an inventory of classes offered in the Atlantis consortium of EU universities to satisfy core requirements and/or controlled electives.

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 residence.

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. Prerequisite(s): (AGEC 1103 or ECON 2023) and (AGEC 2103 or ECON 2013) and (AGEC 2142 or WCOB 1023).

AGEC4163 Agricultural and Rural Development (Sp) 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).

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 2142/AGEC 2141L or 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, develop-

ment, marketing, and delivery-selling of agribusiness rural products. Prerequisite: AGECE 1103 or equivalent.

AGEC4373 Basis Trading: Applied Price Risk Management (Su) 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: AGECE 3373 or consent of instructor.

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: (AGECE 1103 or ECON 2023) and (AGECE 2103 or ECON 2013) and (PSYC 2003 or SOCI 2013 or RSOC 2603).

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 credit.

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

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: Minimum of 3 hours Agricultural Economics or Economics at 3000 level or higher or PhD standing.

AGEC5143 Financial Management in Agriculture (Fa) 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 will 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 (Fa) 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. Prerequisite: MATH 2043 and knowledge of matrix methods, (which may be acquired as a corequisite), and (AGECE 1103 or ECON 2023) and (AGECE 2403 or AGST 4023 or STAT 2303 or WCOB 1033). (Same as ECON 5613)

AGEC5713 Food Safety Law (Irregular) This course provides students with an introduction to food law and policy, history of food regulation, the organization of federal food law and regulatory agencies, government inspection and enforcement powers, food safety standards, food labeling, food advertising and product liability. Web-based course.

AGEC5723 Bioenergy and Resource Economics (Even years, Fa) This course surveys the allocation and conservation of natural resources from a perspective of optimal use and the sustainability of resources. The development and distribution issues relating to energy, land, water, and other resource areas are addressed in the course, with emphasis placed on the bioproducts and bioenergy concerns.

AGEC5733 Bioenergy Economics and Sustainability (Fa) This course will provide an understanding of the economic issues relating to overall supply chains producing bioenergy and bio-based products. The course will address the economic, sustainability and social dimensions of these industries.

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

AGEC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

AGRICULTURAL, FOOD AND LIFE SCIENCES (AFLS)

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The Master of Science in Agricultural, Food and Life Sciences is a collegewide, interdisciplinary program directed by a steering committee. Steering Committee members include:

- Professors Halbrook, Hensley, Kirkpatrick, McLeod, Popp, Rupe, Troxel
- Associate Professors Kreider, Norsworthy
- Assistant Professor Edgar
- Instructor Seideman

The Graduate Certificate in Bioenergy and Sustainable Technology is an interdisciplinary program administered through the Bumper's College Dean's office. Teaching faculty in the Graduate Certificate include:

- Professors Carrier, Matlock, West

All graduate faculty in the Bumpers College of Agricultural, Food and Life Sciences are the faculty of these programs.

Degree Conferred:

M.S. (AFLS)

Graduate Certificate (non-degree)

M.S. (AFLS) degree program information (Global Campus)
http://www.globalcampus.uark.edu/Distance_Education/Graduate_Degree_Programs/index.html

M.S. (AFLS) program description and information (Bumpers College) <http://bumperscollege.uark.edu/544.htm>

Master of Science Program: The Master of Science in Agricultural, Food and Life Sciences is designed for practitioners of diverse backgrounds and perspectives. Graduates are prepared 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 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. Nine hours must be completed in a defined emphasis area of study. Each student will complete one three-hour special problem in which a technical paper will be developed. This requirement may be satisfied by an approved thesis project in one of the agricultural, food and life sciences departments. No more than a total of nine hours of thesis, special problems and internships are recognized for degree requirements with no more than a total of six hours of special problems and internships. Each special problem course should be limited to three hours of credit. An oral examination over all

course work and the special problem project or thesis is required.

The student's advisory committee will outline the total program of study, including work outside the general fields of agriculture, based upon individual needs. The advisory committee will also determine if any course deficiencies should be addressed. An applicant must meet all of the requirements for admission to the Graduate School. The program's steering committee provides guidelines for student admission and establishes degree requirements. The student and the Program Coordinator, with approval of the Dean of the Graduate School, select a major adviser 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 advisory committee, including one member from the program steering committee and one from outside of the defined emphasis area.

Graduate Certificate in Bioenergy and Sustainable Technology: The Graduate Certificate in Bioenergy and Sustainable Technology is a 15-credit hour program developed collaboratively with the University of Arkansas, Kansas State University, Oklahoma State University and South Dakota State University as part of the Great Plains AG*IDEA Consortium.

Admission to the certificate program will follow the University of Arkansas Graduate School requirements.

There are three core areas that correspond with three core courses: 1) feedstock production, 2) processing/conversion/utilization, and 3) sustainability (economics, life cycle analysis and environment). Students seeking the graduate certificate will take nine credit hours of core courses, and six credit hours of elective courses either in the Conversion Track, the Feedstock Track or the Sustainability Track.

Agri, Food & Life Sciences (AFLS)

AFLS5001 Seminar (Fa) Review of scientific literature and oral reports on current research in the agricultural, food and life sciences. May be repeated for up to 4 hours of degree credit.
AFLS500V Study Abroad (Irregular) (1-6) Open to graduate students studying abroad in officially sanctioned programs. May include coursework, internships, special topics, and/or directed individual or group study abroad. May be repeated for up to 24 hours of degree credit.

ANIMAL SCIENCE (ANSC)

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- University Professor Yazwinski
- Professors Apple, Brown (A.H.), Coffey, Jennings, Johnson, Kegley, Kellogg, Looper, Lusby, Maxwell, Pohlman, Roeder (R.), Rorie, Rosenkrans, Troxel
- Adjunct Professors Brown (M.A.), Chewning, Coblentz, Gunter, Moore, Nugent, Pfalzgraf
- Associate Professors Beck, Gadberrry, Jack, Jones, Kreider, Powell
- Assistant Professors Jack, Philipp
- Adjunct Associate Professors Breeding, Friesen
- Adjunct Assistant Professors Baird, Burke, Caldwell, Perkins, Reuter, Roeder (M.), Shanks

Degrees Conferred:

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

Areas of Study: 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 24 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)

ANSC4252 Cow-Calf Management (Fa) Systems of cow-calf management including the practical application of the principles of breeding, feeding, and management to commercial and purebred beef cattle under Arkansas conditions. Lecture 1 hour and laboratory 2 hours per week. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L

ANSC4262 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 1 hour, laboratory 2 hours per week. Corequisite: Lab component. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L and CHEM 2613 and CHEM 2611L.

ANSC4272 Sheep Production (Odd years, Sp) Purebred and commercial sheep management emphasizing the programs of major importance in lamb and wool production in Arkansas. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L.

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. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L.

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. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L.

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. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L.

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. Pre- or Corequisite: ANSC 1041 or ANSC 1051 and CHEM2613/2611L or CHEM3603/3601L and ANSC 1001L and ANSC 2252L and ANSC 2781 and COMM 1313 and BIOL 2013 and BIOL 2011L

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

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 credit.

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).

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)

ANSC5853 Advanced Meats Technology (Even years, Sp) 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. Prerequisite: POSC 4314 or ANSC 3613.

ANSC5901 Seminar (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.

ANSC5923 Brain & Behavior (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: POSC/ANSC 3032 and POSC/ANSC 3042, or PSYC 2003, or BIOL 2213, or BIOL 2443, or BIOL 2533.

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

Degrees Conferred:
M.A., Ph.D. (ANTH)

Areas of Study: 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, material culture, religion, performance studies, sociolinguistics, ethnobiology, medical anthropology, 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.

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 adviser, 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 the written candidacy examinations. Students will notify their committees of their intention to take the examination, and their advisory committee will construct the examination questions. The exams will be taken on campus over a period of three days. The areas that will be examined are discussed in the department's Graduate Student Handbook.

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. They may also chair and serve on student committees.

Anthropology participates in the interdisciplinary Ph.D. program in Environmental Dynamics. See page 104.

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 240 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.

ANTH4133 Settlement Archaeology (Irregular) Focuses on the historical development of settlement archeology, the methods of site survey and discovery within regions, ecological and social theories that underlie patterns of human land use and distribution, methods of site location analysis, and descriptive and predictive site location modeling. Prerequisite: ANTH 3023.

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

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

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

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 theoretical 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 up to 6 hours of degree credit.

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 up to 9 hours of degree credit.

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 GEOS 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 GEOS 4583)

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. (Same as GEOS 4593)

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 (Sp) 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)

ANTH4633 Archeological Prospecting & Remote Sensing (Irregular) 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.

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. (Same as ENDY 5043, GEOS 4653)

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 GEOS 4863)

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

ANTH4913 Topics of the Middle East (Irregular) Covers a special topic or issue. May be repeated for up to 9 hours of degree credit.

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 up to 18 hours of degree credit.

ANTH5043 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 generation, error mapping, and cartographic production. Prerequisite: (ANTH 4563 or GEOS 4583) or equivalent. (Same as GEOS 5033)

ANTH5053 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. (Same as ENDY 5053, GEOS 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.

ANTH5113 Anthropology of the City (Irregular) Examines cities as both products of culture, and sites where culture is made and received. Explores the implications of several pivotal urban and cultural trends and the way in which representations of the city have informed dominant ideas about city space, function, and feel.

ANTH5153 Topics in Anthropology (Irregular) Graduate level seminar with varied emphasis on topics relating to cultural anthropology. May be repeated for credit.

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.

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.

ANTH535V Topics in Physical Anthropology (Irregular) (1-6) Graduate level seminar

with varied emphasis on topics relating to physical anthropology. May be repeated for credit.

ANTH5413 Bioarcheology Seminar (Odd 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.

ANTH5473 Descriptive Linguistics (Fa) A scientific study of language with primary emphasis on modern linguistic theory and analysis. Topics include phonology, morphology, syntax, semantics, language acquisition, and historical development of world languages. (Same as COMM 5463, ENGL 5463, WLLC 5463)

ANTH561V Field Research in Archeology (Irregular) (1-6) Directed graduate level archeological fieldwork. May be repeated for up to 6 hours of degree credit.

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 palaeo-environmental studies, readings and discussion will explore the co-production of social and environmental systems over time. May be repeated for credit. (Same as ENDY 6033)

ANTH610V Internship (Sp, Su, Fa) (1-18) May be repeated for up to 18 hours of degree credit.

ANTH6813 Seminar: Cultural Anthropology (Irregular) Variable topics in Anthropology will be explored in depth. May be repeated for up to 9 hours of degree credit.

ANTH6823 Seminar: Archeology (Irregular) Various topics in Archeology will be explored in depth. May be repeated for up to 9 hours of degree credit.

ANTH6833 Seminar: Biological Anthropology (Irregular) Various topics in Biological Anthropology will be explored in depth. May be repeated for up to 9 hours of degree credit.

ANTH700V Doctoral Dissertation (Sp, Fa) (1-18)

ART (ARTS)

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- Professors Jacobs, Peven
- Associate Professors Hapgood, Hulén, LaPorte, Mazow, Musgnug, Nelson, Newman, Springer
- Assistant Professors Pierce, Pulido Rull, Walls
- Visiting Assistant Professor McConnell, Swartwood
- Clinical Assistant Professor Thompson
- Instructors Jones, King, Posnak, Song, Wiseman

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 Study: Major and/or minor areas of study 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 to 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 45 credit hours in studio courses:
 - a. A minimum major concentration area of 6 credit hours in each of four semesters (total 24 credit hours).
 - b. Two semesters of ARTS 5913 Graduate Seminar in Studio Art, to be taken in the fall semesters of the first and second years of study (total of 6 credit hours).
 - c. A minimum of 15 Studio Art Elective credit hours. These may include 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 4823, 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 Art
3. The required final semester in the M.F.A. program is to be devoted to work on the 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:

1. **Graduate Critiques:** All M.F.A. students are required to participate in regular reviews critiquing their artworks. These reviews involve both a mid-term critique conducted by several faculty members and a final critique attended by the entire department faculty and all current M.F.A. students. After M.F.A. students receive Candidacy, their participation is still required although they will no longer need to present their artwork for review.
2. **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. The awarding of candidacy will be dependent upon a two-thirds majority vote by the graduate faculty based on the following criteria: 1) a demonstrated formal and technical proficiency in the applicant's major studio area; 2) conceptual development as demonstrated by growth in ideas supporting the applicant's creative research; 3) an ability to locate their research in the context of issues and practices within contemporary and historical art issues; and 4) the ability to communicate the intention and basis of their research in coherent written and verbal form. 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)

ARHS4763 Seminar in Critical Theory (Sp) Study of critical theory as it relates to problems in modern and contemporary art. Prerequisite: Nine credit hours of ARHS coursework.

ARHS4763H Honors Seminar in Critical Theory (Sp) Study of critical theory as it relates to problems in modern and contemporary art. Prerequisite: Nine credit hours of ARHS coursework.

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 (Irregular) Study of selections from the visual arts of Mesopotamia, Egypt, Greece, or Rome. Prerequisite: ARHS 2913.

ARHS4843 Medieval Art (Irregular) Study of Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic styles. Prerequisite: ARHS 2913.

ARHS4853 Italian Renaissance Art (Irregular) Study of Proto-Renaissance, Early, High Renaissance, and Mannerist styles in Italy. Prerequisite: ARHS 2923.

ARHS4863 Northern Renaissance Art (Irregular) Study of Late Gothic and Renaissance styles in the Netherlands, Germany, and France. Prerequisite: ARHS 2923.

ARHS4873 Baroque Art (Irregular) Study of art styles of the 17th century, primarily in Italy, Spain, France, Flanders, and the Netherlands. Prerequisite: ARHS 2923.

ARHS4883 18th and 19th Century European Art (Irregular) Study of eighteenth- and nineteenth-century art and architecture in Europe. Prerequisite: ARHS 2923.

ARHS4893 20th Century European Art (Irregular) Study of the major styles and movements of the century, including Cubism, Fauvism, German Expressionism, and Surrealism. Prerequisite: ARHS 2923.

ARHS4913 American Art to 1860 (Irregular) The visual arts in the United States from Colonial times through 1860. Prerequisite: ARHS 2923.

ARHS4923 American Art 1860-1960 (Irregular) The visual arts in the United States from the onset of the American Civil War through the Cold War Era. Prerequisite: ARHS 2923.

ARHS4933 Contemporary Art (Fa) Study of styles and major trends in the visual arts since 1960. Prerequisite: ARHS 2923 and ARHS 4923.

ARHS4933H Honors Contemporary Art (Fa) Study of styles and major trends in the visual arts since 1960. Prerequisite: ARHS 2923 and ARHS 4923.

ARHS4953 Art Museum Studies (Irregular) A survey of the history and function of the art

museum and an introduction to museum work. Investigation of collections and collections management, conservation, exhibitions, education and public programs, museum management, and contemporary issues which effect the museum profession. Prerequisite: ARHS 2913 and ARHS 2923, or graduate Art MFA standing.

ARHS4973 Seminar in Art History (Irregular) Special studies of periods and styles of art. Prerequisite: 9 hours of Art History. May be repeated for up to 6 hours of degree credit.

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. Prerequisite: ARHS 2913 or ARHS 2923. May be repeated for up to 6 hours of degree credit.

ARHS6933 Graduate Research in Art History (Irregular) 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 up to 3 hours of degree credit.

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.

ARTS4333 Bookmaking (Irregular) Introduction to the creation of unique, limited edition artist's bookworks -- with emphasis on technical knowledge and conceptual understanding of the book form as a means of artistic expression.

ARTS4363 Visual Design: Typography (Fa) 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 standards-based hand-coding with a special attention to graphic design standards.

ARTS4623 Visual Design: Web II (Sp) This course will study advanced techniques in creating successful Web sites, including information architecture, SHTML and cascading style sheets, Web animation, digital photography, sequential storytelling and actual client work. Experimentation in concept, 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 (Irregular) 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. Prerequisite: ARTS 1013, ARTS 1313, ARTS 2313.

ARTS4663 Visual Design: Motion Design (Sp) In this course, students will explore motion graphic design as it combines 2D and 3D animation, typography, video footage photography and sound. The projects will explore elements of storytelling, moving compositions and animation principles that focus on Web delivery, using mainly Apple Final Cut Pro and Adobe After Effects. Prerequisite: ARTS 4653.

ARTS469V Special Problems in Interactive Design (Irregular) (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. Prerequisite: ARTS 4613 and ARTS 4623 and ARTS 4653. May be repeated for up to 6 hours of degree credit.

ARTS4813 Digital Photography (Irregular) 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 Black and White Photography (Irregular) Advanced black and white theory, practice and techniques including: Zone System, large format camera and studio lighting. 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 up to 6 hours of degree credit.

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 from 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 up to 6 hours of degree credit.

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

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

ARTS5913 Graduate Seminar in Studio Art (Fa) Examination and analysis of current issues and professional practices in contemporary visual art. The relationship of current theoretical literature to studio practice will be explored through writings, presentations and discussions of graduate student research. Prerequisite: Admission to MFA program. May be repeated for up to 6 hours of degree credit.

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, Fa) (1-6) Individual problems in drawing techniques. Prerequisite: Graduate standing. May be repeated for credit.

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

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

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

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

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

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

ARTS695V Special Topics (Irregular) (1-6) Subject matter not covered in other courses. Prerequisite: Graduate standing. May be repeated for up to 12 hours of degree credit.

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 up to 24 hours of degree credit.

ASIAN STUDIES (AIST)

Ka Zeng
Chair of Studies
428 Old Main
479-575-3356

BIOLOGICAL AND AGRICULTURAL ENGINEERING (BAEG), DEPARTMENT OF

Lalit Verma
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203 Engineering Hall
479-575-2351
E-mail: verma@uark.edu
<http://www.baeg.uark.edu/1932.php>

- Professors Carrier, Haggard, Kim, Li, Loewer, Matlock, VanDevender, Verma
- Associate Professors Costello, Osborn
- Assistant Professors Henry, Liang, Sadaka, Saraswat
- Adjunct Professors Ang, Beitle, Clausen, Deaton, Gardisser, Ingles, Raper, Vories
- Adjunct Associate Professors Bajwa, Shafirstien, Thorbole, Yang
- Adjunct Assistant Professors Hestekin (C.), Howell, Morgan, Wimberly

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) (M.S.B.E.)

Primary Areas of Faculty Research:

The department's mission: Healthy People, Healthy Planet. Biological engineers improve people's lives today and help assure a sustainable quality of life for tomorrow. They create solutions to problems by coupling living systems (human, plant, animal, environmental, food, and microbial) with the tools of engineering and biotechnology. The primary areas of faculty research include:

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, biotransformation to synthesize industrial and pharmaceutical products, bioinstrumentation, bio- and nano-interfacing and molecular self assembly, bio-nano plasmonics, and bio-nano sensing.

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.

Prerequisites to the Degree Program: Admission to the M.S.B.E. program is a three-step process. First, the prospective student must be admitted to graduate standing by the University of Arkansas Graduate School. Second, the student must be accepted into the department's program which depends on transcripts, recommendations, a statement of purpose, and the following additional requirements:

1. A GRE score of 301 or above (verbal and quantitative).
2. A TOEFL score of at least 550 (paper-based) or 213 (computer-based) or 80 (internet-based). This requirement is waived for applicants whose native language is English or who earn a bachelor's or master's degree from a U.S. institution.
3. A member of the faculty who is eligible (graduate status of group II or higher) must agree to serve as the major adviser to the prospective student.

Third, the prospective students will only be admitted to the M.S. programs provided engineering competence can be demonstrated by satisfying one of the following criteria:

1. Receipt of a B.S. degree in engineering from a program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) or equivalent.
2. Students not possessing engineering undergraduate degrees often pursue graduate degrees in Biological Engineering. Students without an ABET-accredited engineering degree (or equivalent) can be admitted to the program, but must earn credit for the following 18 hours of course work in addition to Master's requirements (additional hours may be required for prerequisites): 1) a minimum of 15 credit hours of 2000-level or above of engineering courses (with course prefix BENG, CSCE, CHEG, CVEG, ELEG, INEG, or MEEG) currently allowed for credit within the BENG undergraduate program; 2) minimum of three credit hours of 3000-level or above of BENG engineering design courses currently allowed for credit within the BENG undergraduate program, and 3) specific deficit courses are to be determined in consultation with the student's major adviser and advisory committee. Additional deficiency courses may be required for students with insufficient course work in a critical area (such as life sciences).

In addition to the requirements of the Graduate School, admission to the

departmental aspect of the Ph.D. program depends strongly on the judgment of the individual professor who will serve as the graduate adviser. The minimal admission criteria are: 1) a GRE score of 301 or above (verbal and quantitative), 2) a TOEFL score of at least 550 (paper-based) or 213 (computer-based) or 80 (internet based) (This requirement is waived for applicants whose native language is English or who earn a bachelor's or master's degree from a U.S. institution), 3) a member of the faculty who is eligible (graduate status of group II or higher) must agree to serve as major adviser to the prospective student, and 4) a Master of Science degree in Engineering with a thesis. Unless the candidate has a Master of Science degree in Engineering with a thesis, however, the following admission criteria apply:

1. Students with B.S. degrees in engineering from an ABET accredited program or equivalent may be considered for the Ph.D. program based on their excellent academic records and/or outstanding research experience. Minimum guidelines are a cumulative GPA of 3.5 for undergraduate work, and a minimum GRE score of 307. The Departmental Graduate Committee will review the student's record and make a specific recommendation to the Department Head.
2. Students with both B.S. and M.S. degrees not in engineering will be required to demonstrate engineering competence by either: 1) passing all deficiency courses (listed above under Master of Science in Biological Engineering), or 2) upon approval by the Departmental Graduate Committee, pass a qualifying examination constructed and administered by the Committee.

Students with a non-engineering B.S. degree will *not* be considered for directly starting into the Ph.D. program. Instead, they need to start an M.S. program first. Exceptions must be approved by the Departmental Graduate Committee and the Department Head.

Detailed requirements are in the Biological and Agricultural Engineering Department Graduate Student Handbook, available at <http://baeg.uark.edu/>.

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.

Detailed requirements are in the Biological and Agricultural Engineering Department Graduate Student Handbook, available at <http://baeg.uark.edu/>.

Requirements for the Doctor of Philosophy Degree: In addition to the requirements of the Graduate School, the department follows the College of Engineering's requirements with an additional requirement.

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 stu-

dent 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 a written qualifying exam no later than the first time it is offered after the student has completed his/her first semester of graduate coursework at the University of Arkansas. The purpose of the written qualifying exam for Ph.D. students is to ensure the student has met minimum competency in the broad area of Biological Engineering and will be capable of teaching a sufficient breadth of the core undergraduate courses and upper level undergraduate courses in his/her area of expertise within Biological Engineering. If the student fails the qualifying exam, she/he has the opportunity to retake the exam or sections of the exam once.
7. Satisfactorily pass both a written and oral candidacy examination (Note that the Engineering College defines this examination as a qualifying examination). The purpose of the written and oral candidacy exam is to ensure the student has met a depth of competency in a narrowly focused area of specialization sufficient to understand and advance the current state of the art. After completing approximately two years of graduate study beyond the M.S. degree or equivalent, and at least one year before completing any other requirements, the prospective candidate must take the candidacy examination. Candidacy exam will be given by the student's advisory committee. Students may retake a failed candidacy exam once, contingent upon approval of the student's advisory committee. A student who fails the candidacy examination twice will be terminated from the program.
8. Complete and defend a dissertation on some topic in the student's major field of study.
9. Satisfactorily pass a final comprehensive oral examination.

Detailed requirements are in the Biological and Agricultural Engineering Department Graduate Student Handbook, available at <http://baeg.uark.edu/>.

Biological Engineering (BENG)

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 or BIOL 2533 and BENG 4104.

BENG452V Special Topics in Biological Engineering (Irregular) (1-6) Special topics in biological engineering not covered in other courses. May be repeated for up to 8 hours of degree credit.

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: BENG 3723. Pre- or Corequisite: BENG 4733.

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 up to 6 hours of degree credit.

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 4104.

BENG5113 DIGITAL Remote 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 2584.

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 2584. (Same as BMEG 5203)

BENG5213 Introduction 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. (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 Anesthesiology, Cardiology, Informatics, Ophthalmology, Orthopedic Surgery, and Radiology. Prerequisite: Graduate standing and approval of coordinator.

BENG5233 Tissue Engineering (Fa) Introduction to tissue engineering. Topics include quantitative cell and tissue biology, tissue dynamics, cellular-fate processes, coordination of cellular-fate processes, stem cell differentiation and organ regeneration, biomaterials and tissue scaffolding, gene therapy, and clinical implementation of tissue engineered products. Lecture 2 hours, laboratory 3 hours per week. Students may not earn credit for both BENG 5233 and BENG 4233. Corequisite: Lab component. Prerequisite: CHEM 3613.

BENG5243 Biomaterials (Sp) Study of different classes of biomaterials and their interactions with human tissues. From absorbable sutures to Zirconium alloy hip implants, biomaterials science influences nearly every aspect of medicine. Topics include: biocompatibility factors; natural and synthetic biopolymers, ceramics and metals; orthopedic, dental and cardiovascular implants; ophthalmological and dermatological materials; degradable polymers for drug delivery; nanobiomaterials; smart biomaterials and the regulation of devices and materials by the FDA. Three lectures per week. Students may not earn credit for both BENG 5243 and BENG 4233. Prerequisite: BENG 3712 or MEEG 2303, and MEEG 3013

BENG5253 Bio-Mems (Irregular) 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 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. Prerequisite: MATH 2584 or equivalent and graduate standing.

BENG5273 Numerical Methods in Biomedical Engineering (Sp) Application of mathematical techniques and numerical methods for analyzing biological data and solving biological problems. The emphasis will be computer simulation and mathematical modeling applications in biomedical engineering. Lecture 3 hours per week. Students may not earn credit for both BENG 5273 and BENG 4223. Prerequisite: MATH 2584.

BENG5283 Electronic Response of Biological Tissues (Irregular) Understand the electric and magnetic response of biological tissues with particular reference to neural and cardiovascular systems. Passive and active forms of electric signals in cell communication. We will develop the central electrical mechanisms from the membrane channel to the organ, building on those that are common to many electrically active cells in the body. Analysis of Nernst equation, Goldman equation, linear cable theory, and Hodgkin-Huxley Model of action potential generation and propagation. High frequency response of tissues to microwave excitation, dielectric models for tissue behavior, Debye, Cole-Cole models. Role of bound and free water on tissue properties. Magnetic response of tissues. Experimental methods to measure tissue response. Applications to Electrocardiography & Electroencephalography, Microwave Medical Imaging, RF Ablation will be discussed. Students may not receive credit for both BENG 4283 and BENG 5283. Prerequisite: MATH 2584, ELEG 3703 or PHYS 3414, BIOL 2533 or equivalent. (Same as ELEG 5773)

BENG5303 Fundamentals of Biomass Conversion (Fa) Web-based overview of the technology involved in the conversion of biomass to energy, including associated sustainability issues. Overview of biomass structure and chemical composition; biochemical and thermochemical conversion platforms; issues, such as energy crop production related to water consumption and soil conservation. Further topics include: biomass chemistry, logistics and resources; biological processes; and thermochemical processes. Two web-based lectures/meetings per week. Prerequisite: Graduate standing or instructor consent.

BENG5313 Fundamentals of Bioprocessing (Sp) This course covers the fundamentals of mass and energy balances, fluid dynamics, heat and mass transfer, as applied to Bioprocessing. The microbial growth, kinetics and fermenter operation as applicable to Bioprocessing will be covered in this course. Industrial Bioprocessing case studies that involve the integration of the course contents will be discussed. This course is offered on-line in collaboration with the AG*IDEA consortium of land grant universities. The principal instructor will be a non-UA faculty member at a participating university. Prerequisite: MATH 2554, CHEM 3813, and PHYS 2054.

BENG5323 Bioseparations (Even years, Sp) Study of separations important in food and biochemical engineering such as leaching, extraction, expression, absorption, ion exchange, filtration, centrifugation, membrane separation, and chromatographic separations. This course is offered on-line in collaboration with the AG*IDEA consortium of land grant universities. The principal instructor will be a non-UA faculty member at a participating university. Prerequisite: Instructor Consent.

BENG5333 Biochemical Engineering (Odd years, Sp) The analysis and design of biochemical processing systems with emphasis on fermentation kinetics, continuous fermentations, aera-

tion, agitation, scale up, sterilization, and control. This course is offered on-line in collaboration with the AG*IDEA consortium of land grant universities. The principal instructor will be a non-UA faculty member at a participating university. Prerequisite: Instructor Consent Required.

BENG5343 Advanced Biomass Thermochemical Conversion (Odd years, Fa) Advanced study, evaluation, and application of thermochemical conversion pathways in biofuel production. Specific topics include biomass gasification, pyrolysis, liquefaction, and heterogeneous catalysts. This course is offered on-line in collaboration with the AG*IDEA consortium of land grant universities. The principal instructor will be a non-UA faculty member at a participating university. Prerequisite: Instructor Consent.

BENG5351 Sustainability Seminar (Su) Topics in environmental sustainability, green engineering, life cycle analysis, sustainable development and sustainability science. This course is offered on-line in collaboration with the AG*IDEA consortium of land grant universities. The principal instructor will be a non-UA faculty member at a participating university. Prerequisite: CHEM 1123.

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.

BENG5623 Life Cycle Assessment (Sp) This course will examine the process and methodologies associated with life cycle analysis (LCA). The course will explore the quantitatively rigorous methodology for life cycle inventory (LCI), LCA and life cycle impact assessment (LCIA). This course is offered on-line. The principal instructor will be a UA faculty member.

BENG5633 Linkages Among Technology, Economics and Societal Values (Sp, Fa) Addresses how macro-level change is influenced by the linkages among technology, economics and societal values. Three major course initiatives: 1) Developing a conceptual model for understanding how macro-level change has occurred over history; 2) Examining recorded history in order to develop a contextual appreciation for Society's current situation; and 3) Using statistical data to identify six overriding world trends that are likely to greatly impact society's goal of achieving sustainable prosperity and well-being in the foreseeable future. Prerequisite: Graduate standing or instructor permission. (Same as OMG 5633)

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.

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 4123 (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 BENG 4703 or BENG 5743 or equivalent.

BENG5743 Biotechnology Engineering (Fa) Introduction to biotechnology topics ranging from principles of microbial growth, mass balances, bioprocess engineering as well as emerging principles in the design of biologically based microbial and enzymatic production systems. Application areas such as biofuels, and fine and bulk chemical production. Lecture 2 hours, laboratory 3 hours per week. Students may not earn credit for both BENG 5743 and BENG 4703. Prerequisite: Graduate standing. Corequisite: Lab component.

BENG5801 Graduate Seminar (Sp) Reports presented by graduate students on topics dealing with current research in biological engineering. Prerequisite: Graduate standing.

BENG5923 Nonpoint Source Pollution Control and Modeling (Irregular) 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 Watershed Eco-Hydrology (Sp) Engineering principles involved in assessment and management of surface water flow and hydrologic processes within ecosystems. Includes frequency analysis of rainfall, infiltration, runoff, evapotranspiration. Use of GIS/mathematical models to quantify hydrologic processes at the watershed-landscape scale. Design/implementation of best management practices and ecological engineering principles and processes for advanced ecological services. Lecture 3 hours per week. Students may not earn credit for both BENG 5943 and BENG 4903. Prerequisite: CVEG 3213 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.

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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- Distinguished Professor Henry
- University Professor James, Smith
- Professors Beaupre, Brown, Douglas (M.E.), Durdik, Etges, Gentry, Kral, Rhoads, Sagers, Spiegel, Walker
- Research Professors Kremenetz, Magoulick, Stephenson
- Associate Professors Douglas (M.R.), Ivey, Lehmann, McNabb, Pinto, Silberman
- Assistant Professors Alverson, Barabote, Du, Evans-White, Huxel, Lessner, Tipsmark, Willson
- Research Assistant Professors Faulkner, Goforth, Radwell

Degrees Conferred:

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.

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: The Master of Science degree requires 30 semester hours of graduate credit specified by the department to include at least 24 semester hours of course credit and thesis research. Any student who receives a grade of "D" or "F" in any graduate-level course will be subject to dismissal following review by the Graduate Studies Committee. 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. 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 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. However, students complete a minimum of 72 graduate semester hours if entering the Ph.D. program without a master's degree, or 42 graduate semester hours beyond the master's degree. A minimum of 18 hours must be taken in dissertation credit; these will count in the minimums mentioned in the previous sentence. Any student who receives a grade of "D" or "F" in any graduate-level course will be subject to dismissal following review by the Graduate Studies Committee. Any student receiving more than two grades of "C" in courses of two or more credit hours is no longer eligible for the Ph.D. degree, but may elect to complete an M.S. degree in the 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 first examination, the Candidacy Examination, contains questions related to the student's field of interest and such other areas as the doctoral committee may specify. This examination is given by the doctoral advisory committee in two parts, written and oral. The written and oral portions of the candidacy examination must be completed within the first three calendar years in the program. Satisfactory performance on this examination will be indicated by either pass or fail as determined by the doctoral committee. In the event of failure, the examination may be repeated at the discretion of the doctoral committee. In no case may the candidacy examination be taken more than twice. Notification to the Graduate School of failure to pass the Candidacy Examination means that the student is dismissed from the Ph.D. program, and the student is not eligible for readmission into the Biology program to pursue the Ph.D. degree. The second examination, 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)

- BIOL4013 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. (Same as ENTO 4013)
- BIOL4024 Insect Diversity and Taxonomy (Even years, Fa)** Principles and practices of insect classification and identification with emphasis on adult insects. Corequisite: Lab component. Prerequisite: ENTO 3013. (Same as ENTO 4024)
- BIOL4053 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. (Same as ENTO 4053)
- BIOL4104 Taxonomy of Flowering Plants (Sp)** Identifying, naming, and classifying of wildflowers, weeds, trees, and other flowering plants. Emphasis is on the practical aspects of plant identification. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 1613 and BIOL 1611L and BIOL 2323 and BIOL 3023
- BIOL4114 Dendrology (Odd years, Fa)** Morphology, classification, geographic distribution, and ecology of woody plants. Lecture 3 hours, laboratory 3 hours per week, and fieldtrips. Prerequisite: BIOL 3863.
- BIOL4123 Food Microbiology (Sp)** The study of food microbiology including classification/taxonomy, contamination, preservation and spoilage of different kinds of foods, pathogenic microorganisms, food poisoning, sanitation, control and inspection and beneficial uses of microorganisms. Prerequisite: BIOL 2013/2011 or BIOL 2533. (Same as FDSC 4123)
- BIOL4163 Dynamic Models in Biology (Irregular)** Mathematical and computational techniques for developing, executing, and analyzing dynamic models arising in the biological sciences. Both discrete and continuous time models are studied. Applications include population dynamics, cellular dynamics, and the spread of infectious diseases. Prerequisite: MATH 2554. (Same as MATH 4163)
- 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
- BIOL4333 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. (Same as PLPA 4333)
- BIOL4424 Mycology (Fa)** Form and function of the fungi. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: BIOL 2323 and BIOL 2533 or Graduate Standing.
- BIOL4613 Primate Adaptation and Evolution (Sp)** 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)
- BIOL4693 Forest Ecology (Irregular)** Introduction to the various biological, ecological and historical aspects of forest communities, with particular emphasis on the forests of the central and southeastern United States. Prerequisite: BIOL 3863.
- BIOL4711L Basic Immunology Laboratory (Sp)** Corequisite: BIOL 4713.
- 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.
- BIOL4734 Wildlife Management Techniques (Odd years, Sp)** To familiarize students with techniques used in the management of wildlife populations. Students will be exposed to field methods, approaches to data analysis, experimental design, and how to write a scientific paper. Management applications will be emphasized. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 3863.
- BIOL4774 Biometry (Even years, Sp)** Students learn biological statistics and experimental design by actually designing experiments and analyzing data, as well as through lecture, discussion, reading, writing, and problem solving. Lecture 3 hours, laboratory 3 hours each week. Corequisite: Lab component. Prerequisite: STAT 2023 or equivalent, BIOL 3863.
- 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
- BIOL480V Special Topics in Biological Sciences (Sp, Su, Fa) (1-6)** Consideration of new areas of biological sciences not yet treated adequately in other courses. Prerequisite: 8 hours of biological sciences.
- 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.
- BIOL4863 Analysis of Animal Populations (Even years, Sp)** Basic principles of design and analysis for population studies of fish and wildlife species. Students will be instructed in the use of the latest software for estimating population parameters. Focus will be on both concepts and applications. Management applications of estimated parameters will be emphasized. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 3863.
- BIOL5001 Seminar in Biology (Sp, Fa)** Discussion of selected topics and review of current literature in any area of the biological sciences. (Same as CEMB 5911) May be repeated for up to 2 hours of degree credit.
- BIOL5003 Laboratory in Prokaryote Biology (Sp)** Laboratory techniques in prokaryote culture, identification, physiology, metabolism, and genetics. Laboratory 6 hours per week. Prerequisite: BIOL 3123.
- BIOL5063 Climate Through Time (Irregular)** 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. (Same as ENDY 5063, GEOS 5063)
- BIOL5133 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. (Same as ENTO 5133)
- BIOL5233 Genomics and Bioinformatics (Sp)** Principles of molecular and computational analyses of genomes. Prerequisite: BIOL 2533 or BIOL 2323.
- BIOL5263 Cell Physiology (Fa)** In-depth molecular coverage of cellular processes involved in growth, metabolism, transport, excitation, signaling and motility, with emphasis on function and regulation in eukaryotes, primarily animals. Prerequisite: BIOL 2323, BIOL 2533, BIOL 2531L,

CHEM 3813, and PHYS 2033.

BIOL5303 Plant Physiology (Fa) Introductory course in plant physiology focusing on cellular processes that support the metabolic, developmental, and reproductive needs of plants. Prerequisite: Cell Biology or Biochemistry.

BIOL5313 Molecular Cell Biology (Sp) In-depth molecular coverage of transcription, cell cycle, translation, and protein processing in eukaryotes and prokaryotes. Prerequisite: BIOL 2533 and BIOL 2323 and CHEM 3603 and CHEM 3601L and CHEM 3613 and CHEM 3611L.

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 (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 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.

BIOL5353 Ecological Genetics/genomics (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, BIOL 3023 and MATH 2554 and STAT 2023 or equivalents.

BIOL5404 Comparative Botany (Odd years, Fa) A comparative approach to organisms classically considered to be plants with emphasis on morphology, life history, development, and phylogeny. Three hours lecture, 4 hours lab per week. Corequisite: Lab component. Prerequisite: graduate standing.

BIOL5423 Human Evolutionary Anatomy (Irregular) Paleobiologists reconstruct past life-ways 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 (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.

BIOL5511L Population Ecology Laboratory (Even Years, Fa) Demonstration of the models and concepts from BIOL 5513. Pre- or Corequisite: BIOL 5513.

BIOL5513 Population Ecology (Even years, Fa) Survey of theoretical and applied aspects of populations stressing models of growth, interspecific interactions, and adaptation to physical and biotic environments. Corequisite: BIOL 5511L. Prerequisite: BIOL 3864.

BIOL5523 Plant Ecology (Even years, Sp) To develop understanding of important ecological concepts through study of dynamics relationships among plants and their environment. To become familiar with the literature of plant ecology, and interpretation and critique of ecological research. Prerequisite: BIOL 3864.

BIOL5524 Developmental Biology (Fa) An analysis of the concepts and mechanisms of development emphasizing the experimental approach. Corequisite: Lab component.

BIOL5553 Astrobiology (Irregular) Discusses the scientific basis for the possible existence of extraterrestrial life. Includes the 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. (Same as SPAC 5553)

BIOL5563 Cancer Biology (Fa) An introduction to the fundamentals of cancer biology. Prerequisite: BIOL 2533 (Same as BIOL 4563) May be repeated for up to 6 hours of degree credit.

BIOL5643 Eukaryote Phylogeny (Odd years, Sp) Molecular analysis of the eukaryotic tree of life, phylogenetic tree reconstruction, and eukaryote diversity and evolutionary relationships.

BIOL5703 Mechanisms of Pathogenesis (Fa) A survey of 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.

BIOL5713 Basic Immunology (Sp) A general overview of Immunity with emphasis on the underlying cellular, molecular and genetic events controlling immune reactions. Reading of the primary literature on disease states involving the immune system.

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.

BIOL5753 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: BIOL 2533 and BIOL 2323.

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.

BIOL580V Special Topics in Biological Sciences (Sp, Su, Fa) (1-6) Consideration of new areas of biological sciences not yet treated adequately in other courses. Prerequisite: 8 hours of biological sciences. May be repeated for up to 6 hours of degree credit.

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.

BIOL5833 Animal Behavior (Odd years, Fa) Organization, regulation, and phylogeny of animal behavior, emphasizing vertebrates. Lecture, laboratory, and field work. Corequisite: Lab component.

BIOL5843 Conservation Biology (Irregular) The study of direct and indirect factors by which biodiversity is impacted by human activity. It is a synthetic field of study that incorporates principles of ecology, biogeography, population genetics, economics, sociology, anthropology, philosophy, geology, and geography. Prerequisite: BIOL 3863.

BIOL5844 Community Ecology (Odd years, Fa) 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 (Irregular) (1-3) Project-oriented approach employing current field

and laboratory techniques, experimental design and data analysis. Field trip is required. May be repeated for credit.

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. Corequisite: Lab component. Prerequisite: Some previous course work in ecology is essential.

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.

BIOL6113 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. (Same as ENTO 6113)

BIOL700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Graduate standing. May be repeated for up to 18 hours of degree credit.

BIOMEDICAL ENGINEERING (BMEN)

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- Distinguished Professors Rardin, Saxena, Varadan (V.K.), Varadan (V.V.)
- Professors Ang, Beitle, Carrier, Deaton, El-Shenawee, Kim, Verma, Wickramasinghe
- Associate Professors Roper, Tung, Ye
- Assistant Professors Hestekin (C.), Jin, Servoss, Wejinya, Walchok, Zaharoff

Degrees Conferred:
M.S.B.M.E. (BMEN)
Ph.D. (BMEN) in Engineering

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-master's level.

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

Prerequisites to Degree Program: Admission to the M.S.B.M.E. is a three-step process. First, the prospective student must be admitted to graduate standing by the University of Arkansas Graduate School. Second, the

student must be accepted into the program, which depends on transcripts, recommendations, a statement of purpose, and the following additional requirements:

1. A GPA of 3.00 or higher on the last 60 hours of the baccalaureate degree.
2. A GRE score of 1100 or above (verbal and quantitative) or the equivalent on the new GRE test.
3. A TOEFL score of at least 213 (computer-based) or 80 (internet based). This requirement is waived for applicants whose native language is English or who earn a bachelor's or master's degree from a U.S. institution.
4. A member of the faculty who is eligible (graduate status of group III or higher) must agree to serve as major adviser to the prospective student.

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 an ABET-accredited program or equivalent 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 or equivalent.

I. Basic Engineering Education Requirements

General Education Recommended Courses	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 2584	
University Chemistry II	4
CHEM 1123 & 1121L	
University Physics (calculus based)	4
PHYS 2054 & PHYS 2050L	
General Microbiology	4
BIOL 2013 & BIOL 2011L	
Organic Chemistry I	4
CHEM 3603 and CHEM 3601L	
Introduction to Biochemistry	3
CHEM 3813	
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 3013	
Fluid Mechanics 3	3
CHEG 2133 or MEEG 3503	
Electric Circuits I	3
ELEG 2104	
Electronic Instrumentation for Biological Systems	3
BENG 3104	
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 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 in Biological Systems	3
BENG 4733	
Mechanical Design in Biological Systems	3
BENG 3803	
Biosensors and Bioinstrumentation	3
BENG 4123	
Electronic Instrumentation for Biological Systems	3
BENG 3103	
Engineering 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.B.M.E. 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 5343
 BIOL 5423
 BIOL 5513
 KINS 5323
 KINS 5333
 KINS 5513
 KINS 5523
 KINS 5543
 KINS 6323
 KINS 6343

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

Elective Courses (one elective and two advanced science courses may come from the following)

INEG 4533 Application of Machine Vision
 CHEM 4213 Instrumental Analysis
 CHEM 5223 Chemical Instrumentation
 CHEM 5243 Electrochemical 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

CSCE 5043 Advanced Artificial Intelligence

Elective Courses (one elective and two advanced science courses may come from the following)

BIOL 5263 Cell Physiology
 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 Engineering
 BENG 5243 Biomaterials

Elective Courses (one elective and two advanced science courses may come from the following)

BENG 4113 Risk Analysis for Biological Systems
 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
 BIOL 4713 Basic Immunology
 BIOL 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
 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 advisory committee.

Doctor of Philosophy in Engineering with a Specialization in Biomedical Engineering (BMEG)

The Ph.D. Degree in Engineering with Biomedical Engineering (BME) specialization is an interdisciplinary research degree awarded through the College of Engineering in cooperation with the Graduate School (at the University of Arkansas, there is a common Ph.D. degree for all engineering disciplines). The Ph.D. Degree is earned through advanced coursework and in-depth, specialized research. Graduates from this program will be well-prepared for research careers in academia, industry or government or as entrepreneurs in

technology-based start-up companies.

Admission to Degree Program: Admission into the Ph.D. program with Biomedical Engineering focus is a two-step process. First, the prospective student must be admitted to graduate standing by the University of Arkansas Graduate School. Second, the student must be accepted into the Biomedical Engineering program which depends on transcripts, recommendations, statement of purpose and standardized test scores. Because of the multi-disciplinary nature of Biomedical Engineering, students holding either Engineering or Non-Engineering degrees are eligible to apply. Eligibility criteria are outlined below:

- **Engineering Academic Background:** Students with a BS or MS degree in engineering or engineering equivalent are eligible to apply for the Ph.D. program in engineering with a Biomedical engineering focus.
- **Non-engineering Academic Background:** Students with a non-engineering degree are eligible to apply for conditional admission to the Ph.D. program. These students must first fulfill the admission requirements for the M.S. in Biomedical Engineering (MSBME) as described in the Biomedical Engineering Department Graduate Student Handbook. Upon completion of the "Broader Preparation in Engineering Requirement" with a GPA of at least 3.0, students may be fully admitted into the Ph.D. program. However, students with a non-engineering background are encouraged to first complete the MSBME degree before entering the Ph.D. program.

Complete details for admission are in the Biomedical Engineering Department Graduate Student Handbook, available at <http://bmeg.uark.edu/>.

Requirements for the Doctor of Philosophy Degree: In addition to the requirements of the Graduate School, the department follows the College of Engineering's requirements with additional requirements.

1. All students must complete a minimum of 72 semester hours of graduate-level credit beyond the bachelor's degree, including a minimum of 42 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 24 hours of coursework and up to 6 hours of thesis research toward the minimum dissertation research requirement.
4. Earn a minimum cumulative grade-point average of 3.0 on all graduate courses attempted.
5. Develop a Plan of Study within the first year after matriculation
6. Complete an Annual Progress Report for each year of study (after the initial year.)
7. Satisfactorily pass both a written and oral candidacy examination. The candidacy exam will be given by the student's advisory committee. Students may retake a failed candidacy exam once, contingent upon approval of the student's advisory committee. A student who fails the candidacy examination twice will be terminated from the program.
8. Complete two semesters of teaching assistant assignments.
9. Complete and defend a dissertation on some topic in the student's major field of study.

Detailed requirements are in the Biomedical Engineering Department Graduate Student Handbook, available at <http://bmeg.uark.edu/>.

Coursework Requirements: Students are required to complete 42 credit hours of coursework beyond the BS degree in engineering or equivalent in the following four categories. NOTE: A maximum of 4 credit hours of Special

Problems listings or any other catalog offering which does not have a regular meeting schedule/syllabus may be used to fulfill coursework requirements.

Biomedical Engineering (BMEG) – minimum of 17 credit hours

The following three core courses (9 credit hours) are required for every student.

BMEG 5203 Mathematical Modeling of Physiological Systems or a graduate-level modeling or applied mathematics course with biomedical focus

BMEG 5103 Advanced Instrumentation or a graduate-level instrumentation with biomedical focus

BMEG 5703 Experimental Design and the Statistical Analysis of Experimental Data for Engineering research

Two courses (6 credit hours minimum) must be chosen from BMEG 5000-6000 level courses. (BMEG 5801 Graduate Seminar cannot be counted for this requirement).

Two semesters (2 credit hours) of BMEG 5801 Graduate Seminar

Life Science – minimum of 6 credit hours

Course work must be chosen from the life sciences with the approval of the student's advisory committee.

Engineering Electives – minimum of 9 credit hours

Course work must be chosen from engineering with the approval of the student's advisory committee.

Electives – minimum of 6 credit hours

Course work must be chosen with the approval of the student's advisory committee.

Biomedical Engineering (BMEG)

BMEG5203 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.

Prerequisite: MATH 2584. (Same as BENG 5203)

BMEG560V Advanced Individual Study (Irregular) (1-6) Individual study and research of a topic mutually agreeable to the student and faculty member. Prerequisite: Graduate standing.

BMEG570V Advanced Special Topics (Irregular) (1-6) Consideration of current biomedical engineering topics not covered in other courses. Prerequisite: Graduate standing.

BMEG5801 Graduate Seminar (Sp, Fa) A weekly seminar series comprised of presentations by invited speakers and graduate students as well as didactic instruction in relevant topics including professional development, research ethics, authorship, technology transfer, intellectual property, biosafety, and the use of animals in biomedical research.

Prerequisite: Graduate standing.

BMEG600V Master's Thesis (Irregular) (1-6) Master's Thesis

Prerequisite: Graduate standing.

BMEG700V Doctoral Dissertation (Irregular) (1-6) Doctoral Dissertation

Prerequisite: Graduate standing.

CELL AND MOLECULAR BIOLOGY (CEMB)

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 Director
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- Distinguished Professors Henry, Millett, Oosterhuis, Wilkins
- University Professors Hettiarachchy, Koeppe, Stewart, TeBeest
- Professors Anthony, Bacon, Beitle, Bottje, Cartwright, Chen, Correll, Davis, Donoghue (D.), Douglas (Mi.), Durdik, Durham, Erf, Egges, Fritsch, Goggin, Hargis, Korth, Kral, Kuenzel, Li (Y), Pereira, Rhoads, Ricke, Roper, Rorie, Rosenkrans, Rothrock, Savin, Slavik, Spiegel, Stenken, Stites, Wideman
- Research Professors Donoghue (A.), Lay, Rath, Stephenson
- Associate Professors Adams, Burgos, Douglas (Ma.) Ivey, Kim, Kong, Kreider, Kwon, Lehmann, Li (J.), McIntosh, McNabb, Paul, Pinto, Sakon, Silberman, Smith-Blair, Song, Srivastava, Szalanski, Thallapuranam, Tian, Ye
- Research Associate Professor Jia
- Assistant Professors Baum, Bluhm, Dowling, Du, Hestekin, Jin, Lessner, Mason, Servoss, Tipsmark, Tzanetakis, Washington, Wolchok, Zaharoff
- Research Assistant Professors Goforth, Pumford, Saylor

Degrees Conferred:
M.S., Ph.D. (CEMB)

Areas of Study: 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 prokaryotes, eukaryotes, systematics, forensics, or 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 "F" in any graduate-level course will be subject to dismissal following review by the Program Advisory 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 a Cell and Molecular Biology designated seminar course. Graduate advisory and thesis committees will consist of at least three program faculty representing at least two different departments. With the approval of the student's Graduate Advisory Committee, up to 6 hours of alternative graduate courses may be used to satisfy the 24 hours of course work. 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. Just prior to the Final Examination, the M.S. candidate will present a public seminar announced to all CEMB faculty and students.

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 a Cell and Molecular Biology designated seminar course. Graduate advisory and thesis committees will consist of at least three program faculty representing at least two different departments. With the approval of the student's Graduate Advisory Committee, up to 6 hours of alternative graduate courses may be used to satisfy the 24 hours of course work. 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 Advisory Committee. Any student receiving more than two grades of "C" in courses of two or more credit hours is no longer eligible for the Ph.D., but may elect to complete an M.S. degree in the program. 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 Advisory 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 Advisory 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 Advisory 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 Advisory 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 Dissertation 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. Administration of the final oral defense will follow the Graduate School guidelines outlined in the Graduate Catalog. Just prior to the Final Examination, the Ph.D. candidate will present a public seminar announced to all CEMB faculty and students.

Cell & Molecular Biology (CEMB)

CEMB590V Special Topics in Cell and Molecular Biology (Sp, Su, Fa) (1-6) Consideration of new areas in Cell and Molecular Biology not yet treated adequately in textbooks or in other courses. May be repeated for up to 6 hours of degree credit.

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. May be repeated for credit. (Same as BIOL 5001)

CEMB599T CEMB TRANSFER COURSE

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
- Professors Babcock, Beitle, Clausen, King, Penney, Spicer, Thoma, Ulrich, Wickramasinghe
- Associate Professors Ackerson, Hestekin (J.), Qian
- Assistant Professors Hestekin (C.), Servoss
- Research Professors Cross, Silano
- Adjunct Professor Siebenmorgen Muralidhara
- Adjunct Associate Professor Eason

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; biomaterials; 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; space sciences; supercritical fluids; and life cycle analysis.

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/gradprogram.php>.

An undergraduate or M.S. degree in chemical engineering is required for admission to the graduate program, but students with a B.S. in another field of engineering or in a natural science may also enter the program by first taking certain undergraduate chemical engineering courses to prepare them for graduate study. The requirements for admission to the department's graduate program are:

- A grade point average of 3.0 out of 4.0 in a B.S. or M.S. in chemical engineering or, if the student does not have a degree in chemical engineering, satisfactory completion of the Department's undergraduate deficiency program.
- 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.
- Students without a B.S. degree from a U.S. university will need a minimum score on one of the following English proficiency exams: TOEFL paper exam – 550; iBT computer exam – 79; or IELTS – 6.5. The test must have been 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.

Details about these requirements are in the Chemical Engineering Department Graduate Student Handbook, available at <http://www.cheg.uark.edu/gradstudenthandbook.pdf>.

Research Program: The thesis M.S. degree and the Ph.D. degree involve an interactive, hands-on program that exposes 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 thesis 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.php>.

Requirements for the non-thesis M.S. Degree: At least 30 hours of course work as follows:

MATH 3423 Advanced Applied Math

Note: Because this is an undergraduate course, additional work will be required by the instructor for graduate credit. In addition to this course, the non-thesis student will be able to present only three more hours of 3000-level credit for the degree, with the permission of the advisory committee.

CHEG 5113 Transport Processes I

CHEG 5133 Advanced Reactor Design

CHEG 5333 Advanced Thermodynamics

CHEG 5353 Advanced Separations

CHEG 6123 Transport Processes II

CHEG 6203 Preparation of Research Proposals

3 hours of a 4000 or 5000 level CHEG course

6 hours of any 4000, 5000 or 6000 level technical electives

Note: These electives must be lecture courses, not a special project, seminar or independent research topic.

CHEG 5801 Graduate Seminar (this should be taken every semester)

Assisting in departmental teaching is required.

Requirements for the thesis M.S. Degree: At least 24 hours of course work and six hours of thesis as follows:

MATH 3423 Advanced Applied Math

Note: Because this is an undergraduate course, additional work will be required by the instructor for graduate credit. The thesis student will not be able to present any additional hours of 3000 level credit for the degree.

CHEG 5113 Transport Processes I

CHEG 6203 Preparation of Research Proposals

6 hours from the following four courses:

- CHEG 5133 Advanced Reactor Design
- CHEG 5333 Advanced Thermodynamics
- CHEG 5353 Advanced Separations
- CHEG 6123 Transport Processes II

3 hours of a 4000 or 5000 level CHEG course

3 hours of pure or applied mathematics, 4000 or 5000 level

3 hours of any 4000, 5000 or 6000 level technical electives

Note: These electives must be lecture courses, not a special project, seminar or independent research topic.

6 hours of CHEG 600V Thesis

CHEG 5801 Graduate Seminar (this should be taken every semester)

Research resulting in a successfully defended thesis and assisting in departmental teaching are required.

Requirements for the Ph.D. Degree: At least 48 hours of course work and 30 hours of dissertation as follows:

MATH 3423 Advanced Applied Math

Note: Because this is an undergraduate course, additional work will be required by the instructor for graduate credit.

CHEG 5113 Transport Processes I

CHEG 5133 Advanced Reactor Design

CHEG 5333 Advanced Thermodynamics

CHEG 5353 Advanced Separations

CHEG 6123 Transport Processes II

CHEG 6203 Preparation of Research Proposals

3 hours of a 4000 or 5000 level CHEG course

18 hours of any 4000, 5000 or 6000 level technical electives

6 hours CHEG 5801 Graduate Seminar (this should be taken every semester)

30 hours of CHEG 700V Dissertation

Research resulting in successfully defended dissertation and assisting in departmental teaching are required.

International students must take CHEG 4443 in addition to the above list.

Chemical Engineering (CHEG)

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: CHEG 2133 and CHEG 3323.

CHEG5013 Membrane Separation and System Design (Fa) 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 (Irregular) Contemporary issues affecting the domestic and global Chemical Process Industries (CPI). Emphasis is on process economics, market and corporate strategy as well as advances in technology to improve corporate earnings while addressing the threats and opportunities in the CPI. Prerequisite: Senior or graduate standing.

CHEG5113 Transport Processes I (Fa) Fundamental concepts and laws governing the transfer of momentum, mass, and heat. Pre- or Corequisite: MATH 3423. Prerequisite: CHEG 2313 (or equivalent).

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: 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.

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 (Irregular) 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, distillation, absorption, and extraction. Prerequisite: CHEG 4163.

CHEG5513 Biochemical Engineering Fundamentals (Sp) An introduction to bioprocessing with an emphasis on modern biochemical engineering techniques and biotechnology. Topics

include: basic metabolism (prokaryote and eucaryote), biochemical pathways, enzyme kinetics (including immobilized processes), separation processes (e.g. chromatography) and recombinant DNA methods. Material is covered within the context of mathematical descriptions (calculus, linear algebra) of biochemical phenomenon. Prerequisite: CHEG 3143.

CHEG5733 Polymer Theory and Practice (Fa) 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.

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 up to 6 hours of degree credit.

CHEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

CHEG6123 Transport Processes II (Sp) Continuation of CHEG 5113.

CHEG6203 Preparation of Research Proposals (Sp) Prerequisite: Instructor consent.

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 up to 3 hours of degree credit.

CHEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

CHEMISTRY AND BIOCHEMISTRY (CHBC), DEPARTMENT OF

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- Distinguished Professors Gawley, Koeppe, Millett, Pulay, Wilkins
- University Professors Durham, Hinton
- Professors Bobbitt, Davis, Fritsch, McIntosh, Stenken, Stites
- Associate Professors Adams, Allison, Kumar, Paul, Sakon, Striegler, Tian, Wang
- Assistant Professors Chen, Heyes, Shi, Zheng
- Research Professor Lay
- Research Associate Professor Greathouse

Degrees Conferred:

M.S., Ph.D. in Chemistry (CHEM)

Areas of Study: Analytical, inorganic, organic, physical, biophysical, and biochemistry.

Primary Areas of Faculty Research: Three specialized centers complement traditional research areas in the Department of Chemistry and Biochemistry. These include the Center for Protein Structure and Function, 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 adviser 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: The Master of Science degree in Chemistry requires a minimum 24 hours of course work plus six hours of thesis. A thesis reporting original research will be required of all candidates for the Master of Science degree in chemistry.

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)

CHEM405V Special Topics in Chemistry (Irregular) (1-4) Potential topics include: advanced spectroscopic methods, bioanalytical chemistry, bioinorganic chemistry, bioorganic chemistry, biophysical chemistry, chemical sensors, drug discovery and design, nanomaterials, pharmaceutical chemistry, process analytical chemistry, and protein folding and design. Prerequisite: Instructor consent.

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 2263 and CHEM 2261L and CHEM 3613/3611L) or (CHEM 3713/3712L) 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.

CHEM5101 Introduction to Research (Sp, 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.

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.

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 Physical 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 Methods of Organic Analysis (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).

CHEM5843 Biochemistry II (Sp) A continuation of CHEM 5813 covering topics including biological membranes and bioenergetics, photosynthesis, lipids and lipid metabolism, nucleic acid structure, and synthesis, and molecular biology. Prerequisite: CHEM 5813.

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 3713 and CHEM 3712L) and senior or graduate standing. May be repeated for up to 1 hours of degree credit.

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 credit.

CHEM6283 Mass Spectrometry (Odd years, Sp) 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 credit.

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 credit.

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.

CHEM6643 Organometallic Chemistry (Irregular) Theories and principles of organometallic chemistry. Concepts include bonding, stereochemistry, structure and reactivity, stereochemical principles, conformational, steric and stereoelectronic effects. Transition metal catalysis of organic reactions will also be described.

Prerequisite: CHEM 3504, and CHEM 3514, and CHEM 3703, and CHEM 3713 or permission of instructor.

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 credit.

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 3514 and CHEM 5813) 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: (CHEM 5813 and CHEM 5843) or graduate standing.

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) (1-18) Prerequisite: Graduate standing. May be repeated for up to 18 hours of degree credit.

CHILDHOOD EDUCATION

See the listing in the Department of Curriculum and Instruction, page 83.

CIVIL ENGINEERING (CVEG)

Kevin D. Hall
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<http://cveg.uark.edu>

- University Professors Dennis, Selvam
- Professors Gattis, Hall, Johnson, Wang, Young
- Associate Professors Edwards, Hale, Heymsfield, Soerens
- Assistant Professors Braham, Coffman, Cox, Fairey, Grimmelsman, Zhang
- Research Assistant Professor Williams (S.)
- Visiting Assistant Professor Williams (R.)

Degrees Conferred:

M.S.C.E. in Civil Engineering (CVEG)
M.S.En.E. in Environmental Engineering (ENEG)
(See Environmental 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; roadway 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; and transportation and land development.

In addition to these core areas, the Department of Civil Engineering is also actively pursuing research in the areas of alternative energy sources, infrastructure security, nanotechnology, and sustainability.

Requirements for the Master of Science in Civil Engineering Degree: Minimum 30 semester hours of graduate-level credit (thesis); 33 semester hours of graduate-level credit (report).

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 graduate-level course work plus three semester hours credit of 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. The minimum acceptable grade for any course 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. With guidance from the Committee, the candidate will develop a plan of study and a research project to be completed by the candidate. The Committee will serve as the examination committee for the final oral and/or written examination and for the thesis/report.
5. All graduate students in the Department of Civil Engineering must successfully complete one semester of CVEG 5100 Graduate Seminar in Civil Engineering.

Requirements for the Doctor of Philosophy (Ph.D.) degree with emphasis in Civil Engineering: Minimum 72 semester hours of graduate-level credit beyond the baccalaureate degree; minimum 42 semester hours of

graduate-level credit beyond the master's degree.

1. Candidates for the degree are required to complete a minimum of 48 semester hours of graduate-level course work and a minimum of 18 semester hours of dissertation. Graduate-level course work comprising an earned master's degree may be included in the minimum course work credit hours for the Ph.D. degree.
2. Candidates for the degree must present a cumulative grade point average of 3.00 on all graduate courses. The minimum acceptable grade for any course is "C."
3. All graduate students in the Department of Civil Engineering must successfully complete one semester of CVEG 5100 Graduate Seminar in Civil Engineering.

Civil Engineering (CVEG)

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. Prerequisite: Senior standing and CVEG 2053 with a grade of C or better.

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 with grades of C or better.

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 3133 with a grade of C or better.

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 with a grade of C or better.

CVEG4203 Environmental Regulations and Permits (Fa) Topics include federal and state environmental regulations, the permitting process, permit requirements and related issues. Prerequisite: CVEG 3243 with a grade of C or better and senior standing.

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 3243 with a grade of C or better.

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 with grades of C or better.

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 with a grade of C or better.

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 with a grade of C or better.

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 with a grade of C or better.

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 with a grade of C or better.

CVEG4423 Geometric Design (Fa) The geometric design of streets and highways, based on theory and application of driver and vehicle characteristics. Corequisite: Lab component. Prerequisite: CVEG 3413 with grade of C or better.

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. Corequisite: Lab component. Prerequisite: CVEG 3133, CVEG 3413, and INEG 2313 with grades of C or better.

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) with grades of C or better.

CVEG4812 Environmental Design Project (Sp) Comprehensive engineering design project primarily related to environmental issues. Corequisite: CVEG 4243

CVEG4821 Geotechnical Design Project (Fa) Comprehensive engineering design project primarily related to geotechnical issues. Prerequisite: CVEG 4303 with a grade of C or better..

CVEG4832 Structural Design Project (Sp) Comprehensive engineering design project primarily related to structural issues. Corequisite: CVEG 4323

CVEG4842 Transportation Design Project (Sp) Comprehensive engineering design project primarily related to transportation issues. Corequisite: CVEG 4423.

CVEG4852 Engineering Professional Practice Issues (Sp, Fa) 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.

CVEG488V Special Problems (Irregular) (1-6) Prerequisite: Senior standing. May be repeated for up to 6 hours of degree credit.

CVEG488VH Honors Special Problems (Irregular) (1-6) Service Learning in Belize. Prerequisite: senior standing.

CVEG5100 Graduate Seminar in Civil Engineering (Sp, Fa) A weekly seminar devoted to civil engineering research topics. Appropriate grade to be "S".

CVEG5113 Soil Dynamics (Irregular) This course covers propagation of stress waves in elastic and inelastic materials, dynamic loading of soils, and stiffness and damping properties of soils. Use of field and laboratory techniques to determine shear wave velocity of soils. Also includes applications of dynamic soil properties in site stiffness characterization, geotechnical earthquake engineering, evaluation of ground improvement, and design of machine foundations. Prerequisite: CVEG 4143 with a grade of C or better.

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 with a grade of C or better.

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 with a grade of C or better.

CVEG5163 Seepage and Consolidation (Irregular) Investigation of the flow of water through soils and the time rate of compression of soils. Characterization of the hydraulic conductivity of soils in the field, seepage through earth dams, excavation cut-off walls, and other seepage control systems. Analytical and experimental investigations of soil volume change under hydraulic and mechanical loading. Design of earth and rock dams, well pumping, and vertical and radial consolidation in embankments. Prerequisite: CVEG 4143 with a grade of C or better.

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 with a grade of C or better.

CVEG5183 Geo-Environmental Engineering (Irregular) Study of the geotechnical aspects of waste containment systems and contaminant remediation applications. Analysis and measurement of flow of water and contaminants through saturated and unsaturated soils, clay mineralogy and soil-chemical compatibility, and mechanical and hydraulic behavior of geomembranes, geotextiles, and geosynthetic clay liners. Design and construction aspects of compacted clay and composite landfill systems, drainage systems, and landfill covers. Prerequisite: CVEG 3133 with a grade of C or better.

CVEG5193 Geotechnical Earthquake Engineering (Irregular) This course covers stress wave propagation in soil and rock; influence of soil conditions on seismic ground motion characteristics; evaluation of site response using wave propagation techniques; liquefaction of soils; seismic response of earth structures and slopes. Prerequisite: CVEG 4143 with a grade of C or better.

CVEG5213 Water Treatment & Distribution System Design (Sp) 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 with a grade of C or better.

CVEG5214 Advanced Wastewater Process Design and Analysis (Fa) 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. Corequisite: Lab component. Prerequisite: CVEG 5234 and CVEG 4243 with grades of C or better.

CVEG5233 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 with a grade of C or better.

CVEG5243 Groundwater Hydrology (Irregular) 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.

CVEG5273 Open Channel Flow (Irregular) 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.

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 with a grade of C or better.

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 with a grade of C or better.

CVEG5333 Concrete Materials (Irregular) Topics include portland cement production, supplementary cementing materials, fresh and hardened concrete properties, mixture proportioning, chemical admixtures, curing, and specialty concretes. Corequisite: Lab component. Prerequisite: CVEG 4303 with a grade of C or better.

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 with grades of C or better.

CVEG5353 Prestressed Concrete Design (Irregular) Analysis and design of prestressed concrete beams. Topics include flexural analysis, prestress bond, draping and debonding, allowable stresses, shear analysis and design, camber prediction, and prestress losses. Prerequisite: CVEG 4303 with a grade of C or better.

CVEG5363 Advanced Topics in Reinforced Concrete (Irregular) Analysis and design of reinforced concrete members. Topics include slender columns, one-way and two-way slab design, strut and tie design, and torsion. Prerequisite: CVEG 4303 with a grade of C or better.

CVEG5373 Advanced Structural Steel Design (Irregular) Design of structural steel components using the Load and Resistance Factor Design method. Intensive treatment of simple and eccentric connections, composite construction, plate girders, and plastic analysis and design. Prerequisite: CVEG 4313 with a grade of C or better.

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.

CVEG5393 Advanced Strength of Materials (Irregular) The course will continue from the basic material addressed in the undergraduate course and investigate in more detail stress analysis as it pertains to civil engineering type problems. Topics addressed in the course will include stress analysis (two-dimensional), constitutive relationships, solutions for two-dimensional

problems, flexure, torsion, beams on elastic foundations, and energy methods. Prerequisite: CVEG 2014 or MEEG 3013 with a grade of C or better.

CVEG5403 Advanced Reinforced Concrete II (Irregular) Design of circular and rectangular reinforced concrete tanks for fluid and granular loads. Prerequisite: CVEG 4303 with a grade of C or better.

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 with a grade of C or better.

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 with a grade of C or better or graduate standing.

CVEG5463 Transportation Modeling (Irregular) The use of mathematical techniques and/or computer software to model significant transportation system attributes. May compare model results with actual measured traffic attributes, using existing data sources and/or collecting and analyzing field data. Pre- or Corequisite: Lab component. Prerequisite: Graduate standing.

CVEG5473 Transportation System Characteristics (Irregular) Introduction to traffic flow theory, including traffic stream interactions and capacity. Applications for planning, design, operations. Prerequisite: CVEG 3413 with a grade of C or better 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.

CVEG562V Research (Sp, Su, Fa) (1-6) Fundamental and applied research. Prerequisite: Graduate standing.

CVEG563V Special Problems (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

CVEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

CVEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

CLINTON SCHOOL OF PUBLIC SERVICE (UACS)

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Degree Conferred:

Master of Public Service (M.P.S.)

The Master of Public Service degree is offered at the University of Arkansas Clinton School in Little Rock, Arkansas, in collaboration with the University of Arkansas, the University of Arkansas at Little Rock, and the University of Arkansas for Medical Sciences. For a description of the program, admission and degree requirements, please see the Clinton School's Web site at <http://www.clintonschool.uasys.edu>.

U A Clinton School (UACS)

UACS501V Special Topics in Public Service (Irregular) (1-3) Designed to cover specialized topics not usually presented in depth in regular courses. May be repeated for up to 6 hours of degree credit.

UACS502V Advanced Problems in Public Service (Irregular) (1-3) Provides an opportunity for individual study.

UACS5101 Ethical and Legal Dimensions of Public Service (Irregular) This course will provide an overview of the primary ethical principles and legal concepts that guide difficult deci-

sions in the public realm. Traditional academic study of ethical and legal theory will be combined with practical approaches to problem solving. Students will explore issues of economic, political, and social justice through case studies of current issues. Students will construct cases that are relevant to their own fields and present them to the class, identifying ethical and legal constraints on decision-making and implementation.

UACS5303 Communication Processes and Conflict Transformation (Irregular) The course is designed to increase the student's personal communication effectiveness as a leader and public servant, and to enable students to understand the application of communication processes in the public arena.

UACS5313 Dynamics of Social Change (Irregular) The course deals with the elements of social change in a democratic society, and how these intersect with and are affected by economic and political forces. A critical examination of the various justifications for promoting or discouraging social change will be undertaken, and the inherent strengths and weaknesses of these various approaches will be analyzed. Real-world cases will be used, and a culminating exercise will be a strategic assessment of the Lower Mississippi Delta.

UACS5323 Leadership in Public Service (Irregular) This course is designed to increase students' knowledge of leadership concepts and best practices, provide opportunities and experiences that improve leadership skills and techniques, and enhance capabilities in organizational management. Students will assess their leadership strengths and weaknesses, as well as develop an action plan to match their career goals. They will improve knowledge and skills in building diverse teams, in initiating/managing change, in addressing uncertainty, and in leading non-governmental organizations. At the end of the course, students should be able to design leadership strategies to successfully address a spectrum of issues in public service and in promoting the community good.

UACS5333 Analysis for Decision Making in Public Service (Irregular) This course is intended to provide students with analytical tools that enhance their skills in diagnosing problems and formulating solutions within organizations and communities. Instruction will focus on evaluating community assets as a balance to assessing community need. Underlying values of social justice and collaborative problem-solving provide a benchmark for these activities. Students, working in teams, will be challenged to apply their skills to cases related to affordable housing and homelessness.

COMMUNICATION (COMM)

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<http://www.uark.edu/depts/comm/>

- Professors Allen, Frenz, Scheide, Smith, Webb, Wicks
- Associate Professors Amason, Brady, Rosteck, Warren
- Assistant Professors Cavallero, Corrigan, Schulte, Veden, Walker

Degree Conferred:

M.A. (COMM)

Areas of Study: 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. Prerequisite: COMM 1313 or permission of instructor.

COMM4143 American Film Survey (Fa) A survey of major American film genres, major directors and films that have influenced the development of motion pictures. Prerequisite: COMM 1003 or permission of instructor. (Same as ENGL 4143)

COMM4283 Communication in Contemporary Society (Irregular) An examination of research and theory on the process and effects of communication in modern society. Prerequisite: COMM 1023 and COMM 1233 or permission of instructor.

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.

COMM4323 Communication and Conflict (Fa) 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 1023 or COMM 1313 or permission of instructor.

COMM4333 Communication and Gender (Fa) 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 mediated images in contemporary culture. Prerequisite: COMM 2323 or permission of instructor.

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. Prerequisite: COMM 1023 or COMM 1233.

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 (Even years, 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 (Irregular) A study of the increasing reliance of contemporary presidents on public persuasion through rhetorical discourse.

COMM4393 Freedom of Speech: Cases & Issues (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. Prerequisite: COMM 1313 and COMM 2333.

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. Prerequisite: COMM 2323 or permission of instructor.

COMM4633 History and Development of International Film I (Irregular) 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 1975. Prerequisite: COMM 1003.

COMM4643 Environmental Communication (Irregular) Explores how communication is

used by individuals, corporations, and governments to shape public debates about environmental issues. Topics include rhetorical strategies, the public's right to information and input, dispute resolution techniques, advocacy campaigns, and green marketing. Prerequisite: COMM 1233 and COMM 1313 and COMM 2333 or permission of instructor.

COMM4653 International Film II (Irregular) A critical survey of international film as a distinctive art form as a medium of expression and communication with attention given to films and cinema from 1976 to the present. Prerequisite: COMM 1003.

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. Prerequisite: COMM 1003.

COMM4813 Computer Mediated Communication in Personal Relationships (Sp) Study of the theory and research describing the processes, effects, and management of online communication in personal relationships. Pre- or Corequisite: Three credit hours of COMM coursework.

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. Prerequisite: COMM 3673 or permission of instructor.

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. Prerequisite: COMM 1233 and 2333.

COMM4853 Telecommunication Policy (Irregular) 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: COMM 2813 or permission of instructor.

COMM4863 Seminar in Media (Irregular) Research/discussion of contemporary issues in media. Emphasis on the economic and social impact of advertising, news, censorship, programs directed toward children, portrayals of women and minorities, future trends in media technologies, and analysis of the changing media landscape. Prerequisite: COMM 1233 or permission of instructor.

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 1233 and COMM 2813.

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 for credit.

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 up to 3 hours of degree credit.

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 up to 3 hours of degree credit.

COMM5303 Seminar in Rhetorical Theory (Even years, Fa) Humanistic theories of communication and rhetoric with emphasis upon the development of rhetorical theory in the classical world and upon contributions of contemporary theorists. 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 (Fa) 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 (Irregular) 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 practice 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 2343 or SOCI 4193.

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)

COMM5403 Organizational Communication Theory (Irregular) 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 (Even years, 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 (Irregular) 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 (Irregular) Seminar in major theories of mythology, including archetypal and ideological perspectives, and their applications to the criti-

cism of public communicative events. Practice in written critical analysis. Prerequisite: Graduate standing.

COMM5463 Descriptive Linguistics (Fa) A scientific study of language with primary emphasis on modern linguistic theory and analysis. Topics include phonology, morphology, syntax, semantics, language acquisition, and historical development of world languages. (Same as ANTH 5473, ENGL 5463, WLLC 5463)

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) May be repeated for up to 6 hours of degree credit.

COMM590V Special Problems (Sp, Su, Fa) (1-6) Credit by arrangement. Prerequisite: Graduate standing. May be repeated for credit.

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)

See the listing in the Department of Rehabilitation, Human Resources and Communication Disorders, page 152.

COMPARATIVE LITERATURE AND CULTURAL STUDIES (CLCS)

Keith Booker

Director

333 Kimpel Hall

479-575-4301

E-mail: kbooker@uark.edu

<http://www.uark.edu/ua/cplt/>

Comparative Literature and Cultural Studies Committee:

- Professors Booker, DuVal, Gordon, Haydar, Pritchett, Restrepo
- Associate Professors Arenberg, Fredrick, Kahf, Rosteck, Scheide, Slattery
- Assistant Professor Erickson

See affiliated faculty list on the program's Web page.

Degrees Conferred:

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

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 Study: Master of Arts – Arabic, classics, cultural studies, English, French, German, and Spanish. Doctor of Philosophy – Comparative literature, interdisciplinary Hispanic studies, modern language, cultural studies, literary translation.

Prerequisites to Degree Program: The normal preparation for gradu-

ate 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: In addition to the general requirements of the Graduate School, candidates must meet the following requirements:

1. Each master's candidate must complete 36 hours of course work or 30 hours of course work and six hours of thesis. Master's candidates intending to enter the Ph.D. program are recommended to choose the thesis option. All courses selected must be approved by the adviser, who will consult with the other members of the Master's Program Advisory Committee.
2. Master's candidates in the thesis option must take 12 hours of graduate course work in a first field and six hours of graduate course work in a second field (Arabic, Classics, English, French, German, Spanish, and courses in other disciplines in the humanities and the social sciences).
3. Master's candidates in the non-thesis option must take 12 hours of graduate course work in each of two specialty fields (Arabic, Classics, English, French, German, Spanish, and courses in other disciplines in the humanities and the social sciences).
4. All master's candidates must take a minimum of six hours in world literature and cultures.
5. WLIT 5193 Introduction to Comparative Literature and COMM 5503 Communication and Cultural Studies are required of all candidates in the master's program.
6. Master's candidates who choose cultural studies as one of their fields must demonstrate reading proficiency in a language other than English. The language requirement may be fulfilled either by taking 12 hours in the target language or by taking the reading exam administered by the Department of Foreign Languages.
7. Each master's degree candidate is required to take and pass a comprehensive examination.
8. Master's candidates in the thesis option must present a thesis

proposal early in their second year of study and must turn in the thesis during the last semester of course work, following Graduate School guidelines for thesis submission.

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 adviser 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, interdisciplinary Hispanic studies, 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 adviser, 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. All foreign language requirements must be met before being admitted into candidacy
6. 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.
7. 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.
8. Within the time limits specified by the Graduate School, each student must submit a dissertation acceptable to the student's dissertation committee.
9. 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.

Interdisciplinary Hispanic Studies Concentration: This concentration is designed for candidates with an M.A. in Spanish whose scholarly and teaching interests are primarily in Hispanic studies and in interdisciplinary and transnational approaches to the literatures and cultures of Spain, Latin America and Hispanic U.S. In addition to the general CLCS doctoral requirements, candidates in this concentration will be required to complete 51 hours of graduate course work in Spanish or Hispanic related classes and nine hours of graduate course work in one other field, discipline, or language (i.e. Cultural Studies, Anthropology, History, English, French, Arabic, etc.). Candidates must be fluent in Spanish and English, and demonstrate reading knowledge of another 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 student's University of Arkansas 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 dissertation project may be a study of some translation

issue or a book-length translation of a literary work with a critical introduction and annotated text. 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)

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.

WLIT5193 Introduction to Comparative Literature (Irregular) Literary theory, genres, movements, and influences. Prerequisite: WLIT 1113.

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)

WLIT575V Special Investigations on World Literatures and Cultures (Irregular) (1-6) Independent study of a special topic in world literatures and cultures. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

WLIT600V Master's Thesis (Sp, Su, Fa) (1-6)

WLIT603V Special Studies in Comparative Literature (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

WLIT6703 Psychoanalysis and Culture (Irregular) Readings of key texts 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, and Fernandez Retamar, as well as more recent texts by Said, Spivak, Bhabha, Mignolo, Beverly and Chakrabarty among others. May be repeated for up to 6 hours of degree credit.

WLIT690V Seminar (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

WLIT700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

COMPUTER SCIENCE AND COMPUTER ENGINEERING (CSCE)

Susan Gauch
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- Professors Andrews, Deaton, Gauch (J.), Gauch (S.), Li, Panda, Thompson (C.)
- Associate Professors Beavers, Bobda, Di, Parkerson, Thompson (D.)
- Assistant Professors Banerjee, Huang

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, database security, molecular computing, computer security, digital forensics, next generation computer architectures, RFID information security, embedded systems, hardware/software codesign, low power systems design, pervasive and mobile computing, intelligent Internet applications, image and video processing.

Prerequisite to Degree Programs: The CSCE Department offers two Master of Science degrees, one in Computer Science and one in Computer Engineering. Applicants to the Computer Science MS program should have a Bachelor of Science degree in computer science from an accredited program. Applicants to the Computer Engineering MS program should have a Bachelor of Science degree in computer engineering from an accredited program. Applicants to either program whose transcripts do not show core courses relevant to the program to which they are applying will be assigned deficiency courses. All applicants must present acceptable scores on the General Test of the Graduate Records Examination (GRE).

Master of Science Degree Programs: The Computer Science and Computer Engineering Department offers two Master of Science programs, one in Computer Science and one in Computer Engineering. The two M.S. degrees have common requirements in terms of the number of credit hours required. The two programs are differentiated by the student's advisory committee. The advisory committee will approve courses that are appropriate for the student's program and interests. Students enrolled in the computer engineering program can expect to take more courses with a hardware and systems emphasis, while students enrolled in the computer science program can expect to take more courses with an emphasis in software and theory. All rules and regulations of the CSCE Department, the College of Engineering, and the Graduate School must be followed.

Degree Requirements

1. The *thesis option* (30 hours) requires the successful completion of at least six credit hours of CSCE 610V, Master's Thesis, plus 24 credit hours of course work approved by the candidate's advisory committee. At least 15 of the 24 hours must be CSCE courses at the 5000 level.
2. The non-thesis option (project report, 33 hours) requires the successful completion of at least three credit hours of CSCE 581V, Master's Project, plus 30 credit hours of course work approved by the candidate's graduate committee. At least 18 of the 30 hours must be CSCE courses at the 5000 level.
3. The remaining hours (nine for the thesis option, twelve for the project option) may include no more than six hours of transfer work, three hours of individual study, six hours from outside the department, and nine hours of courses at the 4000 level.
4. Students who complete a BS degree in CSCE at the University of Arkansas, Fayetteville, with a cumulative GPA of 3.5 or greater may count up to six hours of CSCE graduate-level course work (5000 level) completed as an undergraduate student towards the graduate degree.

All CSCE master's students must pass an oral examination and defense of the thesis or project report in, at most, two attempts. The first attempt may not occur before all of the following qualifying conditions have been satisfied:

- Candidates have completed at least 21 hours that are applicable toward the degree. Candidates following the thesis option are currently enrolled in CSCE 610V and those following the non-thesis option are currently enrolled in CSCE 581V.
- The candidate's cumulative grade-point average on all graduate-level courses must be 3.0 or above.
- Any deficiencies assigned upon admission to the program have been removed.

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 Thesis 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.

All other conditions that have been specified by the student's advisory or thesis committee must be satisfied.

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 either computer science or computer engineering.

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 student must attempt the Ph.D. Qualifying Examination 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 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 advisory committee before registering for dissertation hours. This committee must consist of four faculty members who hold qualifying status on the graduate faculty. Three members, including the chair, must hold regular or adjunct appointments in the Department of Computer Science and Computer Engineering. The fourth member should be from outside the department.

For the Candidacy Examination, the student is expected to present a dissertation proposal. Committee members will judge the proposal on its scientific merit, originality, and difficulty. Each Ph.D. student is required to defend a completed dissertation before his or her dissertation committee.

Summary:

1. All students must complete a minimum of 72 semester hours of graduate-level credit beyond the bachelor's degree, including a minimum of 42 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 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 six hours of thesis research toward the minimum dissertation research requirement.
4. Ph.D. students must complete a minimum of nine semester credit hours of course work in a set of coherent courses in a related subject area approved by the student's advisory committee.
5. Students must earn a minimum cumulative grade-point average of 3.0 on all graduate courses attempted.
6. Students must satisfactorily pass both a written and oral qualifying examination.
7. Ph.D. students must complete and defend a dissertation on some topic in the student's major field of study.

8. Students must satisfactorily pass a final comprehensive oral examination.

Computer Sci/Computer Engr (CSCE)

CSCE4043 RFID Information Systems Security (INFOSEC) (Irregular) Radio frequency identification (RFID) information systems provide information to users about objects with RFID tags. They require the application of information systems security (INFOSEC) to protect the information from tampering, unauthorized information disclosure, and denial of service to authorized users. This course addresses security and privacy in an RFID system. Prerequisite: INEG 2313 or STAT 3013.

CSCE4114 Embedded Systems (Fa) 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: Lab component. Prerequisite: CSCE 2214.

CSCE4213 Computer Architecture (Sp) The architecture of modern scalar and parallel computing systems. Techniques for dynamic instruction scheduling, branch prediction, instruction level parallelism, shared and distributed memory multiprocessor systems, array processors, and memory hierarchies. Prerequisite: CSCE 2214. (Same as ELEG 4983)

CSCE4233 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: CSCE 2214.

CSCE4253 Concurrent Computing (Irregular) Programming concurrent processes; computer interconnection network topologies; loosely coupled and tightly coupled parallel computer architectures; designing algorithms for concurrency; distributed computer architectures. Prerequisite: senior standing in computer science or engineering.

CSCE4323 Formal Languages and Computability (Sp) Finite Automata and regular languages, regular expressions, context-free languages and pushdown automata, nondeterminism, grammars, and Turing machines. Church's thesis, halting problem, and undecidability. Prerequisite: CSCE 3313.

CSCE4353 CPLD/FPGA-Based System Design (Irregular) Field Programmable Logic devices (FPGAs/CPLDs) have become extremely popular as basic building blocks for digital systems. They offer a general architecture that users can customize by inducing permanent or reversible physical changes. This course will deal with the implementation of logic options using these devices. Prerequisite: CSCE 2214. (Same as ELEG 4963)

CSCE4423 Computer Systems Modeling (Irregular) Basic concepts of problem analysis, model design, and simulation experiments. A simulation will be introduced and used in this course. Prerequisite: CSCE 2014 and (INEG 2313 or STAT 3013).

CSCE4433 Cryptography (Irregular) This course provides a general introduction to modern cryptography. Topics include: stream ciphers, block ciphers, message authentication codes, public key encryption, key exchange, and signature schemes. Prerequisite: MATH 2603 or MATH 2803.

CSCE4523 Database Management Systems (Fa) Introduction to database management systems, architecture, storage structures, indexing, relational data model, E-R diagrams, query languages, SQL, ODBC, transaction management, integrity, and security. Prerequisite: CSCE 2014.

CSCE4543 Software Architecture (Irregular) A study of software architecture through the use of case studies drawn from real systems designed to solve real problems from technical as well as managerial perspectives. Techniques for designing, building, and evaluating software architectures. Students cannot receive credit for both CSCE 4543 and CSCE 5543. Prerequisite: CSCE 3313 and CSCE 3513.

CSCE4613 Artificial Intelligence (Irregular) Introduction to intelligent agents, AI languages, search, first order logic, knowledge representation, ontologies, problem solving, natural language processing, machine vision, machine learning, and robotics. Prerequisite: CSCE 2014.

CSCE4753 Computer Networks (Irregular) 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 2313 or STAT 3013.

CSCE4813 Computer Graphics (Irregular) Introduction to the theory and algorithms used in computer graphics systems and applications. Topics include: 2D and 3D geometric models (points, lines, polygons, surfaces), affine transformations (rotation, translation, scaling), view-point calculation (clipping, projection), lighting models (light-material interactions, illumination and shadow calculation). Students will implement their own graphics pipeline to demonstrate many of these techniques. Higher level computer graphics applications will be created using OpenGL. Prerequisite: CSCE 2014.

CSCE4914 Advanced Digital Design (Irregular) To master advanced logic design concepts, including the design and testing of synchronous and asynchronous combinational and sequential circuits using state of the art CAD tools. Corequisite: Lab component. Prerequisite: CSCE 2114 or ELEG 2904. (Same as ELEG 4914)

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.

CSCE5013 Advanced Special Topics in Computer Science or Computer Engineering (Irregular) Consideration of current computer engineering or computer science topics not covered in other courses. May be repeated for up to 3 hours of degree credit.

CSCE5033 Advanced Algorithms (Irregular) Design of computer algorithms, with primary emphasis on the development of efficient implementation.

CSCE5043 Advanced 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 and CSCE 4613.

CSCE5053 Advanced Virtual Worlds (Irregular) In depth study of 3D multi-user virtual worlds covering application domains like retail and healthcare logistics, simulations, training, and gaming as well as platform architectures. Students will apply their knowledge of programming and data structures while using synthetic worlds to explore, model and script future smart worlds where computing is pervasive. Students cannot receive credit for both CSCE 4053 and CSCE 5053.

CSCE5203 Advanced Database Systems (Irregular) 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 temporal databases, and knowledge bases. Prerequisite: CSCE 4523 and graduate standing.

CSCE5213 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)

CSCE5223 Introduction to Integrated Circuit Design (Fa) Design and layout of large scale digital integrated circuits using CMOS technology. Topics include MOS devices and basic circuits, integrated circuit layout and fabrication, dynamic logic, circuit design, and layout strategies for large scale CMOS circuits. Students may not receive credit for both CSCE 4333 and CSCE 5223. Prerequisite: ELEG 3213 or ELEG 3933 and MATH 2584.

CSCE5243 Advanced Formal Languages (Irregular) An advanced continuation of CSCE 4323. Prerequisite: CSCE 4323.

CSCE5253L 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, circuit timing, and wire delay. Prerequisite: CSCE 4333.

CSCE5263 Computational Complexity (Irregular) Turing machines, recursion theory and computability, complexity measures, NP-completeness, analysis on NP-complete problems, pseudo-polynomial and approximation.

CSCE5283 Graph and Combinatorial Algorithms (Irregular) A study of algorithms for graphs and combinatorics with special attention to computer implementation and runtime efficiency.

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.

CSCE5323 Computer Security (Irregular) 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 (Irregular) 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 intrusions, computer forensics tools, resources for system administrators and information security officers, legal issues related to computer and network forensics. Prerequisite: CSCE 5323.

CSCE5363L 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 bipolar chip design, gate arrays, BiCMOS, memory design, design for testability, and dynamic & domino logic. Prerequisite: CSCE 5253.

CSCE5433 Advanced Cryptography (Irregular) This course provides an in-depth look into some facet of either cryptographic theory or the implementation of cryptography. Topics may include: the discrete logarithm problem, integer factorization, information theory, elliptic curves, lattices, pseudorandom number generators, zero-knowledge proofs, and quantum cryptography. Prerequisite: CSCE 4433 or instructor consent.

CSCE5533 Advanced Information Retrieval (Irregular) Study of the architecture, implementation, and evaluation of current information retrieval systems. Students will apply their knowledge of programming and data structures to implement a large system with an emphasis on efficiency and scalability. They will study current research in the field and implement individual or group projects on advanced topics. Students cannot receive credit for both CSCE 4553 and CSCE 5533.

CSCE5613 Telecommunications (Irregular) Overview of public and private telecommunication systems, traffic engineering, communications systems basics, information technology, electromagnetics, and data transmission. (Same as ELEG 5613)

CSCE5633 Network Performance Evaluation (Irregular) A study of performance modeling tools for telecommunication networks, computer networks, and wireless networks. Prerequisite: STAT 3013.

CSCE5643 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, queuing analysis, and recent developments in computer communications.

CSCE5653 Network Security (Irregular) 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.

CSCE5683 Digital Image Processing (Irregular) Introduction to digital image processing with an emphasis on practical implementation techniques. Applications include: image acquisition and sampling, image enhancement, noise removal, image restoration, image compression, and object detection. Fundamental methods include: point operations, geometric transformations, linear image processing in the spatial and frequency domains, and non-linear image processing techniques. Basic techniques of linear system theory such as convolution and Fourier transforms will be introduced as necessary to support these topics.

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.

CSCE581V Master's Project (Sp, Su, Fa) (1-6) Required course for report option.

CSCE5823 Multiprocessor Systems on Chip (Irregular) This course covers the latest trends in advanced computer architecture for multiprocessor systems on chip for embedded and real time systems. Topics covered include multicore architectures, modeling abstractions, run time systems, and MIMD/SIMD heterogeneous architectures, Hw/Sw co-design techniques. Prerequisite: CSCE 3613 and CSCE 4213.

CSCE5843 Reconfigurable Computing (Irregular) This course will cover emerging and proposed techniques and issues in Reconfigurable Computing. Topics will include FPGA technologies, CAD/CAE tools, Hw/Sw co-design, system level synthesis, programming models and abstractions. Prerequisite: CSCE 4213 and CSCE 3613.

CSCE590V Advanced Individual Study (Irregular) (1-3) Advanced graduate level individual study directed by faculty in current research topics, state of the art, or advanced methodology in one of the major computer science or computer engineering areas.

CSCE5943 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.

CSCE5983 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: CSCE 4213 or ELEG 4943.

CSCE610V Master's Thesis (Sp, Fa) (1-6)

CSCE620V Post-Master's Research (Sp, Fa) (1-18)

CSCE700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

COUNSELOR EDUCATION (CNED)

See listing in the Department of Rehabilitation, Human Resources, and Communication Disorders, page 152.

CREATIVE WRITING (CRWR)

Dorothy Stephens
Department Chair of English
333 Kimpel Hall
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<http://www.uark.edu/depts/english/PCWT.html/>

- Professors DuVal, Giles, Hays, Heffernan
- Associate Professors Brock, McCombs
- Visiting Associate Professor Gilchrist

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: 60 hours are required for the M.F.A. degree. Candidates with an M.A. degree in English literature may apply up to a maximum of 18 hours toward the M.F.A. degree.

1. Required Writing and Craft Courses
 - a. Writing Workshop (15 to 24 semester hours)
 - b. Craft of Fiction, Poetry or Translation (9 hours total: 6 hours in student's primary genre; 3 hours in second genre)
 - c. Contemporary Fiction and Poetry (9 hours total; 6 hours in student's primary genre; 3 hours in second genre)
 - d. Readings in Modern or Contemporary Literature (6 hours)
2. Other courses, 18–30 hours of English literature or approved courses at the advanced level (4000 or higher).
3. Students interested in Translation will, in consultation with their advisers, develop a program of courses and other requirements tailored to their interest areas. Candidates with a B.A. degree that does not include a major in English may be required to take additional courses.

Comprehensive Examination: A written examination covering critical terms, crafts, 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. For students whose primary genre of interest is in Translation, the thesis will consist of a significant body of work (i.e., poems, stories or a novel) translated from the original language to English. The thesis for all students should be of the quality of those works currently published by national magazines, by literary journals, and by legitimate book publishers.

M.F.A. candidates who take less than 24 hours of workshop may count six hours of thesis credit for their degree required hours. M.F.A. candidates who take 24 hours or more of workshop may count only three hours of thesis credit for their degree required hours.

Final Examination: A one-hour oral examination on the thesis. Awarding

of the M.F.A. degree requires approval of the faculty committee.

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
Department Head
115 Plant Sciences Building
479-575-2354
E-mail: jparent@uark.edu
<http://cses.uark.edu/>

- Distinguished Professor Oosterhuis
- University Professor Wolf
- Professors Bacon, Bourland, Brye, Burgos, Chen, Counce, Daniels, Deren, Gbur, Longer, Mauromoustakos, Miller, Moldenhauer, Norman, Norworthy, Pereira, Purcell, Savin, Scott (R.), Sharpley, Slaton, Smith, Srivastava, Watson, West, Wilson
- Associate Professors Barber, Espinoza, Kelley, Ross
- Research Associate Professor Mattice
- Assistant Professors Anders, Mason, Mozaffari, Scott (J.)
- Research Assistant Professor Roberts

Degrees Conferred:

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

Areas of Study: Crop sciences, soil sciences, and environmental sciences. Areas of specialization within these concentrations include plant breeding and genetics, biotechnology, water quality, 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), and agronomic production 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 Presentations, 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.

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 up to 8 hours of degree credit.

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 for up to 12 hours of degree credit.

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. Pre- or Corequisite: CHEM 1123/1121L. Corequisite: Lab component. Prerequisite: CSES 2201L and CSES 2203.

CSES4234 Plant Anatomy (Irregular) 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 (Even years, 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.

CSES4303 Bioenergy Feedstock Production (Sp) Overview of production and characteristics of cultivated crops, perennial grasses, and woody species as feedstocks for bioenergy. Fundamentals of plant growth factors, culture, harvest and storage, quality and improvement, and introduction to environmental impact, modeling, and resource utilization. Prerequisite: MATH 1203 and BIOL 1543 or CSES 1203. Courses in introductory chemistry or soil science are preferred.

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 4303.

CSES5023 Weed Physiology and Herbicide Resistance in Plants (Even 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 4303 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 4303 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 credit.

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 (Fa) 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 4303 and BIOL 2323 and BIOL 2321L (or ANSC 3123).

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 4303 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 Microbial Ecology (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. Additional suggested prerequisite(s): BIOL 2013, CSES 2203, and ENSC 3003. Prerequisite: BIOL 1543 and BIOL 3863 or ENSC 3223.

CSES5313 Crop Simulation Models in Research, Management and Policy (Even years, Fa) The basics of theory and practice of crop simulation models and their applications in crop research and management, and cropping systems planning and policy. Prerequisite: MATH 1203 and BIOL 1543 or CSES 1203 or consent of instructor. Courses in introductory chemistry and plant physiology are preferred.

CSES5323 Soil/Water Quality in Bioenergy Feedstock Production Systems (Odd years, Fa) Examine concepts of soil and water quality in relation to bioenergy feedstock production, explore research related to biomass removal and by-product addition to soils, and examine the potential effects of proposed feedstock production systems on soil and water quality. Prerequisite: MATH 1203 and CSES 2203 or equivalent or consent of instructor. CSES 4303 (Bioenergy Feedstock Production) preferred.

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.

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. Prerequisite: ANSC 3143 and CSES 3113. (Same as ANSC 6253)

CSES700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Graduate standing.

Agricultural Statistics (AGST)

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 (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 up to 6 hours of degree credit.

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 credit.

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 (Irregular) 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 (Irregular) Supervised statistical consulting. Prerequisite: STAT 5313 and AGST 5901 and either (AGST 5014 or STAT 4373).

CURRICULUM AND INSTRUCTION, DEPARTMENT OF (CIED)

Michael K. Daugherty
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- University Professors Gartin, Smith (T.)
- Professors Collins, Daugherty, Farah, Jolliffe, McComas, Thompson (C.)
- Associate Professors Collier, Goering, Holt, Imbeau, Johnson, Kent, Lincoln, Murphy, Orr, Penner-Williams, Pijanowski, Waverling
- Clinical Associate Professor Eilers
- Assistant Professors Beasley, Bengston, Bowles, Brown (D.), Connors, Endacott, Hewitt, Kimbrell, Paulk, Wissehr
- Clinical Assistant Professors Abernathy, Beck, Casey, Elsass, Greene, Mounts
- Visiting Assistant Professor Gooden
- Adjunct Assistant Professors Dunn, Dickerson, Jones, Kimbrell, Murry, Robbins, Smith, Watts
- Clinical Instructors Bell, Carter, Jordan, Kerr, Kindall, Owen, Smith (D.)

Degrees Conferred:

M.A.T. in Childhood Education (CHED)
 M.A.T. in Secondary Education (SEED)
 M.Ed. in Curriculum and Instruction (CIED)
 M.Ed. in Educational Leadership (EDLE)
 M.Ed. in Educational Technology (ETEC)
 M.Ed. in Secondary Education (SEED)
 M.Ed. in Special Education (SPED)
 Ed.S. in Curriculum and Instruction (CIED)
 Ed.S. in Educational Leadership (EDLE)
 Ed.D. in Educational Leadership (EDLE)
 Ph.D. in Curriculum and Instruction (CIED)

Graduate Certificates Offered (non-degree):

Applied Behavior Analysis (APBA)
 Arkansas Curriculum/Program Administrator (ACPA)
 Autism Spectrum Disorders (AUTS)
 Building-Level Administration (PSBL)
 District-Level Administration (PSDL)
 STEM Education for Early Childhood (K-4) (STEM)

Licensing Offered:

Additional Licensure Program (ALP) in Middle-Level Education

CHILDHOOD EDUCATION (M.A.T.)

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The University of Arkansas offers the Bachelor of Science (B.S.E.) degree in Childhood Education and the Master of Arts in Teaching (M.A.T.) degree in Childhood Education. These combined degree programs are one of the options at the the University of Arkansas, Fayetteville, that lead to initial teacher licensure in Childhood Education (Pre-Kindergarten 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 a Childhood 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, Fayetteville, campus, students must complete the M.A.T. degree program or the undergraduate Elementary Licensure program (see undergraduate catalog for more information). Students also choose either a sub-specialty area of special education or English as a second language, grades 5/6. A graduate certificate in STEM Education for Early Childhood (K-4) is also available.

Prerequisites to Degree Program: Enrollments will be limited in upper division professional studies courses in the Childhood Education B.S.E. Program. In addition, the number of students accepted into the M.A.T. Program in Childhood Education will be contingent upon availability of placements with partnership schools. Specific application procedures, screening, and selection criteria are in effect to limit course enrollments and acceptance to the M.A.T. program. Please contact your childhood education program 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, or 3.00 in the last 60 hours of the baccalaureate degree .
3. Admission to the Graduate School.
4. Screening/acceptance into internship, which includes an admission portfolio.
5. Admission to the Master of Arts in Teaching program.
6. Successful completion of the required criminal background check. Background check materials must be submitted by May 1st prior to the internship year.
7. Completion of the pre-education core with a minimum of "C" in all courses.
8. Completion of all prerequisite courses in teaching field.
9. Payment of internship fee.

Requirements for the Master of Arts in Teaching Degree: (Minimum 33 hours.)

Special Education Option (minimum 33 hours)

- CIED 5003 Childhood Seminar
- CIED 5013 Measurement/Research/Statistical Concepts
- CIED 5022 Classroom Management Concepts
- CIED 5032 Curriculum Design Concepts for Teachers
- CIED 5053 Multicultural Issues in Elementary Education
- CIED 5073 Case Study in Childhood Education
- CIED 508V Childhood Education Cohort Teaching Internship (Six hours)
- CIED 5162 Applied Practicum
- CIED 5173 Literacy Assessment and Intervention
- CIED 532V Practicum in SPED (P-4 for 3 hours)
- CIED 5343 Analysis of Behavior for Teachers

English Second Language Option (minimum 33 hours)

- CIED 5003 Childhood Seminar
- CIED 5013 Measurement/Research/Statistical Concepts
- CIED 5022 Classroom Management Concepts
- CIED 5032 Curriculum Design Concepts for Teachers
- CIED 5053 Multicultural Issues in Elementary 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 and Intervention
- CIED 5933 Second Language Methodologies
- CIED 5953 Second Language Assessment

Grades 5/6 Endorsement for P-4 Candidates (minimum 33 hours)

- CIED 5003 Childhood Seminar
- CIED 5013 Measurement/Research/Statistical Concepts
- CIED 5022 Classroom Management Concepts
- CIED 5032 Curriculum Design Concepts for Teachers
- CIED 5053 Multicultural Issues in Elementary 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 and Intervention
- CIED 5353 Students with Diverse Needs in Middle Education Settings
- CIED 5113 Reading in Middle Schools

Graduate Certificate in STEM Education for Early Childhood (K-4):

Required courses:

- TEED 4033 Introduction to STEM Education
- TEED 5023 Creativity and Innovation in STEM Education
- CIED 5032 Curriculum Design
- CIED 5203 Problem-based Math for STEM Education
- CIED 5213 Problem-based Science in the Elementary Grades

In addition to the required courses, students will maintain a minimum 3.0 GPA; pass Praxis II; complete a year-long internship placement in a local school; and complete an action-research project.

CURRICULUM AND INSTRUCTION (Ed.S./Ph.D.)

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Requirements for the Master of Education Degree: The requirements for the Master of Education degree in Curriculum and Instruction are being changed. Please contact the department or visit the website at cied.uark.edu.

Requirements for the Educational Specialist Degree: 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 Curriculum and Instruction may specialize in one of the following areas: Curriculum and Instruction, Reading, Educational Technology, English as a Second Language, Special Education, 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 of study must also include ESRM 5393 Statistics in Education and Health Professions, and CIED 680V, Ed.S. Project (three hours). Many programs also require ESRM 6623 or equivalent to prepare the project design.

The Ph.D. Program in Curriculum and Instruction: The emphasis of the Doctor of Philosophy degree program in curriculum and instruction is on the generation of new knowledge or the reformulation of existing knowledge as a basis for the development of education theory rather than solely on the improvement of educational practice. 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:
 ESRM 6403 Educational Statistics and Data Processing
 ESRM 6413 Experimental Design in Education
 CIED 6443 Advanced Research in Curriculum & Instruction
 Six additional hours from the following:
 ESRM 6423 Multiple Regression Techniques for Education
 ESRM 6453 Applied Multivariate Statistics

ESRM 6533 Qualitative Research

ESRM 6653 Measurement and Evaluation

ESRM 699V Seminar (as approved by advisory committee)

Other 5000- or 6000-level classes with approval of advisory committee

3. 24 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 9 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 program. 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)

CIED4433 The Moral Mind in Action (Fa) The Moral Mind in Action explores how people reason through moral dilemmas and prepares students to more effectively recognize and resolve moral problems. Best practices of teachers and administrators of K-16 character education programs are discussed.

CIED4443 Moral Courage (Sp) Moral Courage explores the factors that support translating moral thinking into moral action. This course draws from the field of positive psychology to guide students as they leverage existing strengths and develop new strategies for acting with moral courage in their personal and professional lives. Best practices of teachers and administrators of K-16 character education programs are discussed.

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.

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.

CIED5043 Content Area Reading in Elementary Grades (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.

CIED5062 Literacies Across the Curriculum (Sp) This course teaches the integration of reading, writing, and new literacies in the content areas. Theory and strategy are presented as integrated strands of the language process as 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 in Secondary 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) Successful completion of criminal background check required before beginning teaching internship. May be repeated for up to 6 hours of degree credit.

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 in Middle Schools (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.

CIED5143 Internship: Middle Level (Sp, Su, Fa) The internship for middle level education is an extended field experience in which a pre-service teacher integrates knowledge and skills developed in education classes with practice in the field. Prerequisite: Admission to the M.A.T. program.

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 and Intervention (Su, Fa) Focuses on assessment of young children's literacy skills. Techniques discussed include informal observation, miscue analysis, and portfolio assessment. Prerequisite: Admission to graduate school.

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.

CIED5203 Problem-Based Mathematics (Irregular) This graduate level course focuses on sharing, modeling and practicing strategies to support the meaningful integration of science, technology, engineering and mathematics (STEM) with the emphasis on mathematics in the K-4 classroom. A strong foundation for integrating the STEM disciplines through a problems-based approach within the elementary curriculum will be developed by providing students with theoretical frameworks, research, resources, and methods related to appropriate and effective classroom practice. Prerequisite: CIED 3123 (Mathematical Methods).

CIED5213 Teaching Problem-Based Science in the Elementary Grades (Sp) This graduate level course focuses on sharing, modeling and practicing strategies to support the meaningful integration of science, technology, engineering and mathematics (STEM) with the emphasis on science in the K-4 classroom. A strong foundation for integrating the STEM disciplines through a problems-based approach within the elementary curriculum will be developed by providing students with theoretical frameworks, research, resources, and methods related to appropriate and effective classroom practice. Prerequisite: Successful completion of CIED 3143 (Teaching Science) and admission to the M.A.T. program or enrollment in the M. Ed. 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 (Irregular) (1-6) Successful completion of criminal background check required prior to beginning teaching internship. May be repeated for up to 6 hours of degree credit.

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.

CIED5303 Adolescence and Learning (Sp) Study of the developmental characteristics (physical, emotional, social and intellectual) of early and late adolescence (ages 10-18; grades 5 to 12). The progression from early to late adolescence and the implications this evolution has for learning, motivation, instruction and classroom practices are emphasized. Prerequisite: PSYC 2003.

CIED532V Practicum in Special Education (Irregular) (1-6) Supervised field experiences in special education programs, schools, institutions, and other facilities for exceptional children.

CIED5343 Analysis of Behavior for Teachers (Sp) 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 the use of functional analysis are addressed.

CIED5353 Teaching Students with Diverse Needs in Middle Education Settings (Irregular) To provide future scholar-practitioners with a knowledge base concerning the issues involved in the successful instruction of persons with special learning needs during middle school years.

CIED5393 Introduction to Linguistics (Fa) This course is an introduction to human language. The goal is to understand what it means to speak a language, including an introduction to phonetics and phonology (specifically the sound system of American English), morphology (the rules of English at the word level), syntax (rules that govern sentence level language), semantics (meanings of words) and sociolinguistics (or the study of language use in its social context).

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.

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 Methods and Materials for Teaching Children's and Adolescent Literature (Irregular) 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.

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) 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.

CIED5513 Sound System of American English (Fa) This course will study the structure and development of American English (AE). Topics include: 1) the structure/systems of American English pronunciation, 2) vowels, 3) consonant system (including such features as minimal pairs, 4) prosody, intonation, rhythm, and stress, and 5) regionalism and social varieties, and 6) pedagogical approaches to teaching the features of American English.

CIED5533 Teaching Language Arts (Sp) 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.

CIED5543 Structures of American English (Sp, Su) This course provides an introduction to the grammars of English, including (but not restricted to) traditional, structural, and transformational-generative (universal grammar). It includes approaches to the teaching of all types of grammars.

CIED5563 Teaching Internship/Action Research (Irregular) During this course, Master's candidates will be provided with classroom time to prepare to teach and then will be assigned to a classroom or classrooms. During this time the candidates will have an opportunity (under supervision) to observe, to teach and to participate in classroom activities. Additionally, candidates will research some area of their own pedagogy relevant to the experience.

CIED5573 Foundations of Literacy (Sp, Su, Fa) Teaching of reading to children; techniques, research, and modern practices.

CIED5583 Correlates of Reading Process (Irregular) 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 Advance Diagnosis and Intervention (Irregular) 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 (Odd years, 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) 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.

CIED564V Science Instructional Strategies (Irregular) (1-6) Methods and materials in teaching specific science content with a focus on that content and/or the pedagogical perspectives necessary for effective and engaging instruction. May be repeated for up to 6 hours of degree credit.

CIED5653 Methods of Middle School Instruction (Su) Philosophy, rationale, and instructional practices of middle school instruction. Prerequisite: Graduate standing.

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.

CIED5703 English Language Arts and Reading Standards: Contents and Quality (Irregular) This course will (1) examine the purposes, contents, and quality of K-12 English language arts and reading standards, (2) analyze their relationship to classroom and school district curricula, student assessment, educator licensing regulations, licensure tests, and professional development, (3) and explore educational, social, and political issues raised by ELA/R standards.

CIED5713 Integrating the Elementary Curriculum (Su) This course focuses on meaningful integration of science, mathematics, literacy, social studies, art, and music in the elementary classroom. A strong foundation for integrating the elementary Curriculum will be developed by providing students with theoretical frameworks, research, resources, and methods related to classroom practice. Strategies to coordinate the integration of these subject areas for the K-4 classroom will be modeled.

CIED5723 Nature and Needs of Persons with Mild Disabilities (Fa) Educational, psychological, and social characteristics of individuals who have mild disabilities with emphasis on educational methods and modifications. Prerequisite: CIED 3023.

CIED5733 Inclusive Practices for Diverse Populations (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.

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.

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.

CIED5763 Teaching Individuals with Severe Disabilities (Sp) Methods and materials for teaching students with severe disabilities, including severe mental retardation, serious emotional disturbance, and severe physical disabilities.

CIED5773 Methods for Young Children with Disabilities (Irregular) This course is one of the substantive core courses required of all students being recommended for the P-4 Instructional Specialist license. The Scholar-Practitioner Model at this level provides an introduction to the education of young children with special learning needs and a foundation for the developing professional.

CIED5783 Professional and Family Partnerships (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 family-school partnerships from early childhood through the transition to adulthood while emphasizing advance learning in the specialty studies and the social and behavioral studies in the substantive areas. Prerequisite: Admission to graduate school.

CIED5793 Practicum in Literacy (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 and 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.

CIED5843 Representations of American Education in Film (Irregular) This course provides an examination of students, teachers, administrators, schools, and schooling as they exist on the silver screen. Of particular interest is how film representations and misrepresentations potentially affect public perceptions of education. This course draws on educational theory and the field of cultural studies.

CIED5853 Issues in Mathematics Education (Irregular) Study of research in mathematics education and applications to classroom teaching and learning. Emphasis will be given past and current research in the areas of students' cognitive development in mathematics, mathematics curriculum development, and teaching practices and assessment.

CIED5863 Teaching Global Issues (Odd years, Sp) Global interdependence and its consequent issues have become an integral part of most social studies programs in American schools. Some schools developed specific courses, required or elective, and others include them in existing history, economics, government and civic courses. Secondary social studies teachers and their students explore these issues as part of current events discussions. Prerequisite: Graduate standing.

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 (Fa) 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, responsibilities and problems of organization, administration, and supervision of special education programs.

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 (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 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 Middle and Secondary Schools (Irregular) Methods and materials of teaching reading in secondary schools with emphasis on remedial and developmental reading problems of students.

CIED5973 Practicum in Secondary Education (Sp, Fa) Students will engage in action research in a school setting to advance their knowledge of teaching and learning venues including schools and informal learning environments. Prerequisite: Permission.

CIED5983 Practicum in C & I (Sp, Su, Fa) This course will provide degree candidates with advance knowledge of teaching in the elementary or secondary schools. This will be accomplished through a semester-long practicum during which an action research project will be designed, enacted, and reported. Prerequisite: Admission to the M.Ed. Program. May be repeated for up to 6 hours of degree credit.

CIED599V Special Topics (Sp, Su, Fa) (1-18) May be repeated for up to 18 hours of degree credit.

CIED600V Master's Thesis (Sp, Su, Fa) (1-6) This course is designed for students completing a thesis at the master's level in curriculum and instruction and related programs. It may be taken multiple times for 1-6 credits but no more than 6 credits will be counted toward the degree. Prerequisite: Graduate Standing May be repeated for up to 6 hours of degree credit.

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 be-

tween 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. Prerequisite: Admissions to Ed.S. or Ph.D. program.

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. Prerequisite: Admission to Ed.S. or Ph.D. program.

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.

CIED6113 Trends and Issues in Social Studies Education (Odd years, Sp) Analysis of social studies education including an examination of the historical, political and social issues that have shaped curriculum, pedagogy and the educator's role in the increasingly complex endeavor to prepare future citizens.

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.

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.

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 growth in science instruction. Prerequisite: Admission to graduate school.

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 up to 6 hours of degree credit.

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 Mixed Methods Research (Sp) This course will provide opportunities for students to acquire the skills, knowledge, and strategies necessary to design and implement a mixed methods research study. Emphasis is upon developing research questions, developing a research design, selecting a sample, and utilizing appropriate techniques for analyzing data.

CIED6503 Effective Teaching: Concepts and Processes (Sp) 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.

CIED6533 Problem-Based Learning and Teaching (Irregular) A course in the design, development, and delivery of the problem-based learning (PBL) model. Theoretical cases and curriculum models will be centered on issues and models related to PBL.

CIED6603 Multicultural Education (Su) 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 (Irregular) (1-18) May be repeated for up to 18 hours of degree credit.

CIED674V Internship (Sp, Su, Fa) (1-6) May be repeated for up to 6 hours of degree credit.

CIED6803 Teaching Students with Autism Spectrum Disorders (Fa) This course provide students with an understanding of individuals who have been diagnosed with autism spectrum disorders. The course provides a life-span perspective by focusing on preschoolers, school-aged children, and adults. Students will study the characteristics of these individuals and general educational strategies for their education. **CIED680V Ed.S. Project (Sp, Su, Fa) (1-6)** Instructor permission required to register. Prerequisite: Instructor permission.

CIED6813 Assessment of Students with Autism Spectrum Disorders (Sp) This course provides an in-depth study of the assessment of individuals with autism spectrum disorders. It includes formal and informal assessment measures used to assist in the identification of students with ASD, as well as provide information for program development for this group of students.

CIED6823 Instructional Methods for Students with Autism Spectrum Disorders (Fa) This course is designed to assist professional educators in planning and implementing instructional and support services for students with autism spectrum disorders. Students will learn how to participate in collaborative family, school, and community partnerships.

CIED6833 Practicum in Autism Spectrum Disorders (Sp, Su, Fa) Supervised field experiences in programs, schools, and other settings for children with autism spectrum disorders.

CIED6843 Basic Principles of ABA (Fa) Course provides information on : (a) the philosophical assumptions and principles of behavior analysis; (b) basic principles, processes, and concepts of applied behavior analysis; and (c) ethical and legal

issues involved in its use.

CIED6853 Behavioral Assessment in ABA (Fa) Course content includes information on effective methods and the development of skills: (a) assessing, organizing, and interpreting behavior; (b) conducting task analysis and selecting intervention goals and strategies; (c) displaying data; and (d) making evidence-based decisions. Legal and ethical standards will be reviewed and applied to behavioral change procedures used.

CIED6863 Behavior Change Procedures and Supports (Su) Course content includes (a) information on behavior change procedures; (b) activities designed to acquire skill in developing and evaluating behavioral change programs; and (c) information and activities designed to acquire skills in providing and monitoring persons and systems providing support. Legal and ethical standards will be reviewed and applied to the course content.

CIED6873 Measurement and Experimental Design (Sp) Course content includes information on and the development of skills in: (a) the measurement of the multiple dimensions of behaviors; (b) the use of methods of measuring behavior; (c) the experimental evaluation of interventions; and (d) the multiple methods of displaying and interpreting behavioral data. Legal and ethical standards will be reviewed and applied to the course content.

CIED6883 ABA Ethical, Professional, and Legal Standards (Fa) Course content includes information on the ethical, professional and legal standards in special education and, specifically, the area of applied behavior analysis.

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 up to 6 hours of degree credit.

CIED695V Independent Study (Sp, Su, Fa) (1-6)

CIED699V Doctoral Seminar (Sp, Su, Fa) (1-3) May be repeated for up to 3 hours of degree credit.

CIED700V Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy

EDUCATIONAL LEADERSHIP (EDLE) (M.Ed., Ed.S., Ed.D.)

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The Educational Leadership Degrees are designed to prepare qualified persons for a variety of leadership roles.

Areas of Study: Principalships and other school-site administrative and supervisory positions; superintendents and other central administrative personnel; federal and state governmental positions in education; and educational leadership.

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; principal succession; and moral decision making.

Prerequisites for Acceptance to the Graduate Certificate Programs in Building-Level Administration, District-Level Administration and Arkansas Curriculum/Program Administrator: Applicants must meet University requirements for admission to the Graduate School as non-degree-seeking, but certificate-seeking students, and must have a State of Arkansas recognized master's degree. In addition, to receive the graduate certificate in district-level administration, applicants must have a valid teaching license and a valid building-level administration license.

Requirements for Building- or District-level Graduate Certificates: 18 semester hours plus two prerequisite courses (*) from the appropriate list of courses with a grade-point average of 3.0:

Building-Level Administration (18-24 hours)

EDLE 5013 School Organization & Administration*
 EDLE 5023 The School Principalship
 EDLE 5043 Leadership Ethics
 EDLE 5053 School Law
 EDLE 5063 Instructional Leadership, Planning & Supervision*
 EDLE 5083 Analytical Decision Making
 EDLE 5093 Effective Leadership for School Improvement
 EDLE 574V Building-Level Internship (3 hours)

District-Level Administration (18 hours)

EDLE 6023 School Facilities Planning and Management

EDLE 6053 School-Community Relations

EDLE 6093 School District Governance: The Superintendency

EDLE 6103 School Finance

EDLE 6173 School Business Management

EDLE 674V District-Level Internship (3 hours)

Note: If the certificate candidate is an experienced and practicing administrator at another administrative licensure level, the six required courses may be reduced by one course for a total of 15 hours past prerequisites. All certificate programs of study courses must be completed within five years before submission to the Arkansas Department of Education.

Requirements for the Graduate Certificate in Arkansas Curriculum/Program Administrator: To receive the graduate certificate in Arkansas Curriculum/Program Administrator, students are required to have a valid teaching license and a master's degree. The program of study includes the following 15-18 hours of Educational Leadership core courses that constitute the standards associated with that body of knowledge and the application of appropriate skills and dispositions to be a successful school administrator. All courses are required, but do not have to be completed in any particular order. Candidates may present acceptable course work for transfer credit by presenting official transcripts from an NCATE accredited and approved educational leadership program of study, but a maximum of six hours of transfer work may be used to fulfill the requirements of the certificate. Candidates will complete required course projects and activities related to the area of specialization.

Educational Leadership Courses

EDLE 5013 School Organization & Administration

EDLE 5043 Leadership Ethics

EDLE 5063 Instructional Leadership, Planning, and Supervision

EDLE 5083 Analytical Decision-Making

EDLE 5093 Effective Leadership for School Improvement

CIED 674V Internship in Specialty Area

Special Education Courses (15 hours)

CIED 532V Practicum in Special Education

CIED 5733 Inclusive Practices for Diverse Populations

CIED 5783 Professional and Family Partnerships

CIED 5893 Organization, Administration and Supervision of Special Education

CIED 6433 Legal Aspects of Special Education

Curriculum and Instruction (15 hours)

CIED 5423 Curriculum Reconstruction

CIED 5453 Evaluation Techniques

CIED 5613 Contemporary Issues in Education

CIED 6013 Curriculum Development

CIED 674V Internship

Prerequisites at the master's level may be required according to the candidate's area of specialization. A faculty representative from the area of specialization will make this determination at the time of admission.

Prerequisites for Acceptance to the M.Ed., Ed.S., and Ed.D. Programs:

In addition to meeting University requirements for admission to the Graduate School, all candidates seeking admission to any educational leadership 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 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 leadership faculty to demonstrate compatibility of program course offerings with the applicant's goals and interests is required.

Requirements for the Master of Education (M.Ed.) Degree: The master's degree in Educational Leadership is designed primarily to provide professional preparation for students seeking administrative positions in elementary

and secondary schools. It requires the following:

Completion of a minimum of 33 graduate semester-hour credits.

Completion of the following required common courses in Educational Leadership (24 credits):

EDLE 5013 School Organization and Administration

EDLE 5023 The School Principalship

EDLE 5043 Leadership Ethics

EDLE 5053 School Law

EDLE 5063 Instructional Leadership, Planning and Supervision

EDLE 5083 Analytical Decision Making

EDLE 5093 Effective Leadership for School Improvement

EDLE 574V Internship (3 hours)

Completion of nine credit hours from foundations courses, including:

EDLE 5033 Psychology of Learning OR EDFD 5373

Psychological Foundations of Teaching and Learning

EDLE 5073 Research for Leaders OR EDFD 5013 Research Methods in Education OR ESRM 5393 Statistics in Education and Health Professions

EDLE 5003 Schools and Society OR EDFD 5303 Historical Foundations of Modern Education

A cumulative grade-point average of at least 3.00 on all course work is required for the degree. No grades below "C" will be accepted for graduate degree credit.

Satisfactory performance on a written comprehensive examination or portfolio presentation is required.

Requirements for the Educational Specialist Degree: The specialist degree program in Educational Leadership 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. Certificate for District Level Licensure, students are required to take EDLE 674V District-Level Internship. The six-month internship course requires a minimum of 20 hours per week for each week in each of the six months for a minimum total of 216 hours. The internship requires that a licensed practitioner practicing at either the P-8 or 7-12 grade levels serve as a member throughout the internship process. This mentor/student relationships is supervised by an Educational Leadership faculty member.

At the completion of these courses for either the Ed.S. degree or the Certificate for District-Level Licensure, students are required to take EDLE 674V District-Level Internship. The six-month internship course requires a minimum of 20 hours per week for each week in each of the six months for a minimum total of 216 hours. The internship requires that a licensed practitioner practicing at either the P-8 or 7-12 grade levels serve as a mentor throughout the internship process. The mentor/student relationship is supervised by an Educational Leadership faculty member.

The Educational Specialist degree in Educational Leadership requires a minimum 63 credit hours beyond the baccalaureate degree, with 33 hours in the M.Ed. degree plus 30 hours in the Ed.S. degree:

EDLE 6023 School Facilities Planning and Management

EDLE 6053 School-Community Relations

EDLE 6093 School District Governance: The Superintendency

EDLE 6103 School Finance

EDLE 6173 School Business Management

EDLE 674V Internship (3 hours)

EDLE 6333 Advanced Fiscal and Legal Issues in Education*

The following three research courses are to be taken in sequence:

EDLE 6503 Topics in Educational Research for School Administration

EDLE 6543 Quantitative Analysis and Empirical Methods (prerequisite EDLE 6503) or ESRM 6403

EDLE 6513 Program Evaluation in Education - this course will be where students write the specialist project or EDLE 680V (prerequisite EDLE 6503 and ESRM 6403)

*EDLE Licensure Core Course Requirements for the Degree (18 credit hours)

Note: Prior to District-Level Licensure application, all students must present a Culminating Portfolio to a committee of faculty with practitioner representation for the district-level license.

Requirements for the Doctor of Education Degree: The Doctor of Education degree in educational leadership requires the completion of a minimum of 96 graduate semester hour credits, including 18 dissertation hours. The 96 credit hours include up to 60 hours of course work completed toward the master's and specialist degrees. If students enter the Ed.D. program without a specialist degree in Educational Leadership, they are required to complete the courses in the specialist program.

Requirements for the Ed.D. degree in Educational Leadership include:

Completion of the courses required for the Master of Education degree in Educational Leadership

Completion of the courses required for the Educational Specialist degree in Educational Leadership

EDLE 6533 Educational Policy

ESRM 6533 Qualitative Research or HRWD 572V

EDLE 699V Seminar, taken on campus three times for one credit each. Doctoral students will come to campus to meet with faculty and practitioners for a one-credit seminar that will serve as a valuable capstone for the distance experience. The meaningful campus experience will be an intensive long weekend cohort seminar on the University of Arkansas campus. Each cohort weekend will be focused on a theme that connects theory with practice and includes mini-lectures by scholars and practitioners in the field, facilitated discussion groups, and lively debate of critical issues facing school leaders. The intent of the cohort weekend is to build relationships, introduce students to leaders in the field and expose them to interactive, hands-on learning experiences that lend themselves more easily to the face-to-face environment.

Nine credit hours from either the program evaluation track or the quantitative track:

Program Evaluation Track

- ESRM 6543 Advanced Data Qualitative Research OR EDLE 6553 Advanced Qualitative Methods in Education Research

- EDLE 6563 Advanced Data Collection for Program Evaluation (Prerequisite: EDLE 6513 Program in Evaluation in Education; this course may be taken after the comprehensive exam)

- EDLE 6573 Advanced Empirical Analysis for Program Evaluation (may be taken after the comprehensive exam)

Quantitative Track

- ESRM 6413 Experimental Design in Education

- ESRM 6423 Multiple Regression Techniques for Education

- ESRM 6623 Techniques of Research in Education

18 semester hours of dissertation credit

A minimum grade point average of at least 3.25 on all graduate course work, and on all course work presented for the Ed.D. degree.

Satisfactory completion of all requirements governing the written and oral examinations for the candidacy examination, the disserta-

tion, and the final oral dissertation defense.

The Ed.D. degree must be completed within seven years from the date the Declaration of Intent is signed.

The program of study must comply with University residency requirements.

Educational Leadership (EDLE)

EDLE5003 Schools and Society (Even years, Su) Schools and Society is an introduction to the social, structural, political and historical forces that have created the American school system.

EDLE5013 School Organization and Administration (Odd years, Su) (Fa) Analysis of structure and organization of American public education; fundamental principles of school management and administration.

EDLE5023 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.

EDLE5033 Psychology of Learning (Sp) (Odd years, Su) This course prepares educational leaders to create and sustain a learning centered environment in school settings. Students will study learning theory across the lifespan and apply it to the practice of instructional leadership, curriculum design, and staff development.

EDLE5043 Leadership Ethics (Odd years, Su) (Fa) Leadership Ethics is an experiential based course grounded in ethical decision making theory that uses case study and practice to study school based ethical dilemmas.

EDLE5053 School Law (Odd years, Su) (Fa) Legal aspects of public and private schooling: federal and state legislative statutes and judicial decisions, with emphasis upon Arkansas public education.

EDLE5063 Instructional Leadership, Planning, and Supervision (Odd years, Su) (Fa) Instructional Leadership, Planning, and Supervision is designed to prepare practitioners to seize the role of educational leader at the school site level through the development of a vision that will be used to drive a data driven instructional school plan.

EDLE5073 Research for Leaders (Sp) (Odd years, Su) This course introduces research methodology that will support school leaders as consumers of educational research and supervisors of action research within their schools. Practical application of research for school leaders is emphasized.

EDLE5083 Analytical Decision-Making (Sp) (Even years, Su) Analytical Decision Making is a performance based examination of the principles and practices related to the building administrator's role in the development, administration, and evaluation of curricular programs in public schools. This includes creating a school culture, fostering communication, aligning curriculum with state mandated standards, and staff development.

EDLE5093 Effective Leadership for School Improvement (Sp, Su) A performance based examination of strategic planning, group facilitation and decision-making, organizational behavior and development, professional ethics and standards, student services administration, and principles of effective leadership.

EDLE574V 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 up to 3 hours of degree credit.

EDLE600V Master's Thesis (Sp, Su, Fa) (1-6)

EDLE6023 School Facilities Planning and Management (Odd years, Fa) School facilities planning, management, cost analysis, operations, and maintenance of the school plant.

EDLE6053 School-Community Relations (Even years, Sp) 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.

EDLE605V Independent Study (Sp, Su, Fa) (1-6) May be repeated for up to 6 hours of degree credit.

EDLE6093 School District Governance: The Superintendency (Even years, Fa) Analysis of the organizational and governance structures of American public education at national, state, and local levels.

EDLE6103 School Finance (Odd years, Sp) Principles, issues and problems of school funding formulae and fiscal allocations to school districts.

EDLE6173 School Business Management (Odd years, Su) Fiscal and resource management in public schools: budgeting, insurance, purchasing, and accounting.

EDLE6333 Advanced Fiscal and Legal Issues in Education (Odd years, Sp) The examination and discussion of advanced legal and fiscal issues affecting public school education. Prerequisite: Advanced graduate standing.

EDLE6503 Topics in Educational Research for School Administration (Odd years, Fa) 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.

EDLE6513 Program Evaluation in Education (Sp) Program Evaluation in Education is designed to introduce students to concepts and methods of policy and program evaluation. Emphasis will be placed on preparing educational leadership students to conduct a program evaluation specialist project of dissertation. Prerequisite: EDLE 6503 and ESRM 6403 or equivalent.

EDLE6523 Advanced Application of Educational Leadership (Odd years, Su) A review of seminal and current works on leadership as applied to the educational setting. Provides knowledge of classic and contemporary strategies for leadership.

EDLE6533 Educational Policy (Odd years, Sp) 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.

EDLE6553 Advanced Qualitative Methods in Educational Research (Sp) This course has been designed to provide graduate students with a more in-depth understanding of qualitative research methods. Emphasis will be placed on preparing educational leadership students to design a qualitative or mixed-method dissertation study. Prerequisite: ESRM 6543 or WDED 572V.

EDLE6563 Advanced Data Collection for Program Evaluation (Odd years, Fa) This course is designed to provide graduate students with an in-depth understanding of how to effectively collect data for a program evaluation. Emphasis will be placed on guiding educational leadership students through the data collection procedures they will use for their dissertation. Prerequisite: ESRM 6543 or EDLE 6553

EDLE6573 Advanced Empirical Analysis for Program Evaluation (Sp) This course is designed to provide graduate students with an in-depth understanding of how to effectively analyze data for a program evaluation. Emphasis will be placed on guiding educational leadership students through the data analysis procedures they will use for their dissertation. Prerequisite:

EDLE 6563.

EDLE674V Internship (Sp, Su, Fa) (1-6) May be repeated for up to 6 hours of degree credit.
EDLE680V 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.

EDLE699V Seminar (Sp, Su, Fa) (1-6) Prerequisite: Advanced graduate standing. May be repeated for up to 6 hours of degree credit.

EDLE700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

EDUCATIONAL TECHNOLOGY (ETEC) (M.Ed.)

Cheryl Murphy
 Program Coordinator
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The Educational Technology Program is a 34-hour non-thesis on-line master's program that 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 3.00 GPA on the last 60 hours of 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 34 hours of graduate course work to include 22 semester hours of educational technology courses; nine semester hours of education technology courses; and three semester hours of research. Additionally, a Culminating Student Portfolio must be successfully completed in the last semester of course work in the EPortfolio Production course and will replace the Graduate School requirement of a comprehensive examination. (Note: Degree requirements have recently changed. Those students who entered the program in a previous year who have not maintained continuous enrollment may petition the program coordinator to be allowed to continue under the catalog in effect when they were admitted.)

Degree Requirements: (34 hours)

1. Educational Technology Core: 22 hours
2. Educational Technology Electives: 9 hours
3. College of Education and Health Professions research course: 3 hours
4. Culminating Student Portfolio: Completed during the last semester of course work.

Required ETEC Courses (22 semester hours):

- ETEC 5203 Foundations of Educational Technology (3 credit hours)
- ETEC 5213 Introduction to Educational Media (3 credit hours)
- ETEC 5243 Instructional Design Theories and Models (3 credit hours)
- ETEC 5313 Principles in Visual Literacy (3 credit hours)
- ETEC 5373 Web Design (3 credit hours)
- ETEC 6223 Strategic Planning in IDT Programs (3 credit hours)
- ETEC 6253 Distance Learning (3 credit hours)
- ETEC 5981 EPortfolio Production (1 credit hour)

Elective ETEC Courses (9 semester hours required):

- Choose three of the following:
- ETEC 5253 Information Technologies (3 credit hours)
- ETEC 5263 Grant Writing in Instructional Technology (3 credit hours)
- ETEC 5303 Computers in the K-12 Classroom (3 credit hours)
- ETEC 6243 Advanced Instructional Design (3 credit hours)
- ETEC 6393 Issues and Trends in Instructional Design and Technology (3 credit hours)

Required Research Course (3 semester hours):

Choose one of the following:

ESRM 5013 Research Methods

AGED 5473 Interpreting Social Data

HHPR 5353 Research in Health, Human Performance and Recreation

Culminating EPortfolio

A Culminating Electronic Student Portfolio must be successfully completed in the last semester of course work in the EPortfolio Production course.

 Educational Technologies (ETEC)

ETEC5203 Foundations of Educational 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.

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 (Irregular) Students perform intensive examinations of the role of new technologies and their implications for instructional practice. Emphasis is on identification and evaluation of new technologies in instructional environments. Establishing and maintaining learning environments, exploring selected theories and concepts, assessing potential uses of IT, and utilization of new technologies will occur.

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 media 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.

ETEC5283 Field Experiences in Educational Technology (Sp, Su, Fa) Field experience in educational technology settings. Prerequisite: Graduate standing and 6 hours of graduate work in educational technology.

ETEC5303 Learning with Computers in K-12 Classrooms (Irregular) Students learn how technology can be used to support K-12 classroom environments. Various learning theories and technologies will be explored and projects will be developed that utilize technologies and current learning theories in K-12 settings. Emphasis is on identification, evaluation, and the effective use of technologies to support classroom environments. Prerequisite: Graduate standing.

ETEC5313 Principles in Visual Literacy (Irregular) Students gain understanding of visual literacy research and learn to create graphics that support learning. Literature in the area of visual literacy and learning theories as well as tools that facilitate effective visual literacy will be used to create visuals that are clear, communicate well, and help enhance learner performance.

ETEC5373 Web Design (Irregular) Students design, create, and analyze Web sites by applying processes, standards and techniques used to identify target audience; ensure compliance with copyright and disability laws, measure effectiveness, and coordinate Web design. Topics include copyright and fair use, user and task analysis, usability, accessibility, testing, search engine optimization, and web analytics. May be repeated for up to 3 hours of degree credit.

ETEC5743 Internship (Sp, Su, Fa) 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 up to 6 hours of degree credit.

ETEC5981 Eportfolio Production (Sp, Su, Fa) This is a capstone course designed to: 1) review key constructs presented within the Educational Technology curriculum; 2) provide ETEC students the opportunity for reflection relative to his/her learning of the key concepts; and 3) utilize technology to assemble student-created artifacts that demonstrate mastery of the key concepts. Prerequisite: Must be in last semester of coursework.

ETEC5993 Seminar (Irregular) 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 up to 6 hours of degree credit.

ETEC600V Master's Thesis (Sp, Su, Fa) (1-6)

ETEC6053 Special Problems in Educational Technology (Sp, Su, Fa) 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 up to 6 hours of degree credit.

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.

ETEC6243 Advanced Instructional Design (Sp) This course explores advanced topics in instructional design to facilitate understanding of grounded models, advanced theories, and research. This course focuses on: 1) design and development of contextualized technology-supported learning environments; 2) analysis and application of advanced theoretical foundations of design; and 3) examination and critique of instructional design research. Prerequisite: ETEC 5243 or equivalent.

ETEC6253 Distance Learning (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.

ELEMENTARY EDUCATION/READING (ELED/RDNG) (M.Ed.)

Cathy Wissher

Program Leader

G 02 Stone House South

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Requirements for the Master of Education Degree: (Minimum 33 hours.) Candidates for the master's degree in elementary education must complete a minimum of 33 hours of graduate course work: 21 hours from courses in elementary education (ELED) with 15 hours from the following areas – English as a second language (ESL), language arts, mathematics, science, children's literature, social studies, early childhood education, reading, special education, or general elementary education; 3 hours of electives; and 9 core hours, including ESRM 5013 Research Methods in Education and three hours from each of the areas listed below. The required research course (ESRM 5013) is to be taken during the first 12 hours of degree coursework and the Practicum in Curriculum and Instruction (CIED 5893) is taken at the end. (The major adviser must approve all courses.)

1. EDFD 5373 Psych. Foundations of Teaching and Learning

EDFD 5573 Life-Span Human Development

2. EDFD 5303 Historical Foundations of Modern Education

EDFD 5353 Philosophy of Education

All candidates who receive the master's degree in elementary education must pass the master's comprehensive examination which will consist of the defense of the results of an action research project. 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 the B.S.E. program in Childhood Education.

MIDDLE-LEVEL EDUCATION (MLED) (Additional Licensure; M.A.T.)

Charlene Johnson

Program Leader

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Additional Licensure: The University of Arkansas offers additional licensure in Middle-Level Education. This program allows individuals with an Arkansas teaching license in P-4 or 7-12 to add a teaching license in grades 5 and 6.

Prerequisites to the Middle-Level ALP Program: Students will be selected if they are licensed childhood education or secondary education teachers who wish to add a teaching license in grades 5 and 6. Students must first be admitted to the Graduate School.

Requirements for the ALP Program in Middle-Level Education (9 hours)

CIED 3053 The Emerging Adolescent

CIED 5653 Methods of Middle-School Instruction

CIED 5353 Teaching Students with Diverse Needs in Middle Education Settings

The Master of Arts in Teaching (M.A.T.) degree program in Middle Level Education is a 34-semester hour program. The M.A.T. degree is the initial licensure program for students at the University of Arkansas, Fayetteville. The program will no longer be accepting students, but will continue to hold classes until May 2011.

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 and Praxis II Middle Level Content
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
 - CIED 3023 Survey of Exceptionalities
 - CIED 3033 Classroom Learning Theory
 - CIED 3053 The Emerging Adolescent
 - CIED 3043 Introduction to Middle Level Principles and Methods
 - CIED 3063 Literacy Strategies for Middle Level Learners
 - CIED 3073 Early Adolescent Literature
6. Completion of all prerequisite courses in teaching field
7. Satisfactory completion of Pre-M.A.T. degree check
8. 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 (34 hours)

- CIED 5052 Seminar: Multicultural Issues
- CIED 5093 Methods of Instruction for Middle Level I
- CIED 5113 Reading in Middle Schools
- CIED 5193 Methods of Instruction for Middle School II
- CIED 5022 Classroom Management Concepts
- CIED 5132 Research in Middle Level Curriculum & Instruction
- CIED 5143 Internship: Middle Level (Six Hours)
- CIED 5293 Special Methods, Interdisciplinary Section
- CIED 5103 Advanced Middle Level Principles
- CIED 5012 Measurement, Research, and Statistical Concepts for Teachers
- CIED 5123 Writing Process Across the Curriculum

SECONDARY EDUCATION (SEED) (M.A.T., M.Ed.)

Michael Wavering
 Program Coordinator
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Students seeking admission to the Secondary Master of Arts in Teaching Program at the University of Arkansas must be aware of the deadlines and admissions policies. Once all admission requirements are met by each candidate, a committee will review all applications and notify accepted and denied candidates by April 1st. Each of the five content areas (English, foreign languages, mathematics, science and social studies) has a maximum number of 12 students admitted each year and up to 60 students in the overall program. If spaces remain in a particular content area and the overall program capacity has not yet been met by April 1, admissions for that area will be considered on a rolling basis until the beginning of the first summer session. These deadlines and limitations are designed to ensure that all students have a high quality experience and reflect current need for teachers in any particular content area.

To apply for admission to the Master of Arts in Teaching program in Secondary Education, you must:

1. Complete an appropriate undergraduate degree program (see pre-

MAT transcript evaluation for additional requirements for area of licensure at <http://coehp.uark.edu/4891.htm>).

2. Hold a minimum GPA of 3.0 in the last 60 hours of the completed undergraduate degree.
3. Complete an Evaluation for Internship Form by October 1 (<http://coehp.uark.edu/4954.htm>).
4. File an application for admission to the Graduate School by January 31.
5. Pass Praxis I exam before admission to the program.
6. Send three letters of recommendation before the interview in February to Janet Johnson-Mertz, 113 Peabody Hall, 1 University of Arkansas, Fayetteville, AR 72701.
7. Successfully complete the required criminal background check. Background check materials must be submitted by May 1.
8. Schedule and complete an admission screening interview with a portfolio in February.

For Fulbright College Students: Complete a B.A. or B.S. in mathematics. Complete these additional course requirements: MATH 3773 Geometry, MATH 3133 History of Mathematics, STAT 3013 Probability and Statistics.

Note: at the time of the interview, candidates must have a GPA of 3.0 on the last 60 hours of undergraduate coursework, have passed the PRAXIS I exam, submitted three letters of reference, and submitted a portfolio. Additionally, foreign language majors must submit proof of having passed the foreign language proficiency exam.

Once we have received all application materials from the Graduate School, an admission decision will be made based on the criteria described in the admissions policy statement. The probationary status will include the content specific courses of the spring semester term. The number admitted into specific teaching fields will be determined by both availability of internship spaces in the public schools with Cohort Partnership agreements and job market potential. However, meeting or exceeding minimum requirements does not guarantee acceptance into the M.A.T.

At the completion of the first 6 hours of M.A.T. courses (which are taken in the summer semester), the secondary education faculty will review the status of all the students in the program. Students with unsatisfactory performance (grades of C or lower) in the summer courses will not be allowed to continue with the remainder of the program.

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 the 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. Pass Praxis I
8. Take Praxis II content test(s) before the end of the summer session of admission.

Requirements for the Master of Arts in Teaching Degree in Secondary Education: (Minimum 33-34 hours.)

1. Computer competencies will be demonstrated by the candidate in the admission portfolio, or by taking an approved course.
2. CIED 4131 Practicum in Secondary Education. Candidates for the Secondary Education M.A.T. program will register for this course. The requirement for this course is 60 hours of experience with children in grades 7 through 12. A minimum of 30 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.

- Students will take CIED 3023 Survey of Exceptionalities or CIED 4023 Teaching in Inclusive Secondary Settings. CIED 4023 is the preferred course.
- Students in French, German, and Spanish will take CIED 4013 Senior Capstone Course (spring semester). Students will compile a portfolio in the target language with several pieces of evidence from their content classes. In addition, students must obtain a minimum passing score of Advanced Low on the Oral Proficiency Interview prior to admission into the fall internship.

Secondary M.A.T. courses:

- CIED 5022 Classroom Management Concepts (fall semester)
 CIED 5032 Curriculum Design Concepts for Teachers (spring semester)
 CIED 5052 Seminar: Multicultural Issues (spring semester)
 CIED 5062 Literacies Across the Curriculum (spring semester – non-English licensure only)
 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 with career and technical education (CATE). 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 except for students in Career and Technical Education. 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).

NOTE: Students pursuing the career and technical education concentration (CATE) may complete a program of study that leads to licensure in Arkansas and/or take advanced courses to expand their professional knowledge. Students pursuing this concentration must meet with a CATE faculty adviser before admission to the program for additional requirements.

Prerequisites to the Master of Education Degree Program:

- Minimum 3.0 grade-point average on the last 60 hours of undergraduate courses or 2.50 grade-point average on all undergraduate courses and a Miller Analogies Test score at the 50th percentile or above, and
- 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.

Program Requirements: minimum 33 hours

Required Core Courses: 9 semester hours – 3 hours from each of the following three areas:

- ESRM 5013 Research Methods in Education
HKRD 5353 Research in HKRD
ESRM 5393 Statistics in Education and Health Professions
 - EDFD 5373 Psychological Foundations of Teaching and Learning
EDFD 5573 Life-Span Human Development
 - EDFD 5303 Historical Foundations of Modern Education
EDFD 5353 Philosophy of Education
- Secondary Education Courses: 12 semester hours
- CIED 5623 The School Curriculum
 - Three semester hours of field experience
 - Three semester hours selected with adviser's consent.
 - CIED 5983 Practicum in Curriculum and Instruction

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

- 9 additional hours in secondary education (SEED) courses
- 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

- Teacher certification in at least one field
- CIED 5923 Second Language Acquisition
CIED 5933 Second Language Methodologies
CIED 5943 Teaching People of Other Cultures
CIED 5953 Second Language Assessment
- Course in multiculturalism

Option 5: Career and Technical Education

- Nine (9) hours college core
- CATE 4003 Introduction to Professionalism
CATE 4023 Classroom Management
CATE 5013 Teaching Strategies
CATE 5016 Cohort Teaching Internship
CATE 5033 Assessment/Program Evaluation
CATE 5623 The School Curriculum
CIED 5733 Inclusive Practices for Diverse Populations

Or

- CATE 5543 Technology for Teaching and Learning
 CIED 5623 The School Curriculum
 CATE 5573 Instructional Materials
 CIED 5733 Inclusive Practices for Diverse Populations
 Six (6) semester hours selected with adviser's consent
 Six (6) semester hours other professional education courses

Career and Technical Education (CATE)

CATE4003 Introduction to Professionalism (Fa) Studying and developing educational concepts in career and technical education with accepted principles of professionalism in secondary education settings.

CATE4023 Classroom Management (Fa) Theory and techniques in classroom management, including professional ethics and school policies related to students, faculty and programs.

CATE5013 Teaching Strategies (Fa) This course is designed to offer a variety of ideas and experiences concerning methods of teaching, planning and presenting instruction.

CATE5016 Cohort Teaching Internship (Sp) A minimum of 12 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.

CATE5033 Assessment/Program Evaluation (Fa) An introduction to constructing, evaluating, and interpreting tests; descriptive and inferential statistics; state competency testing; and guidelines for state program evaluations. Prerequisite: Graduate Status

CATE5453 Career Orientation Programs (Su) Provides a survey of types and sources of occupational information and methods of providing occupational-oriented experiences. Designed for teachers and future teachers of career orientation and is 1 of 2 required courses for vocational career orientation.

CATE5463 Applications in Career Orientation (Su) Student is introduced to various teaching methods and techniques of managing hands-on activities in career orientation class setting.

CATE5503 Trends and Issues in Technology Education (Sp, Su, Fa) A comprehensive technology education methods course pertaining to the teaching of standards-based curriculum materials.

CATE5543 Technology for Teaching and Learning (Su, Fa) A study of computer technology as it relates to teacher education. This course concentrates on knowledge and performance and includes hands-on technology activities that can be incorporated in an educational setting. Students interact with the instructor and other students via BlackBoard and engage in weekly discussions and acquire hands-on computer technology experience.

CATE5573 Instructional Materials (Sp, Su) A comprehensive course designed to give students the opportunity to understand, prepare, and test materials leading toward excellence in instruction.

SPECIAL EDUCATION (SPED) (M.Ed.)

Barbara Gartin
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Requirements for the Master of Special 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. ESRM 5013 Research Methods in Education
ESRM 5393 Statistics in Education and Health Professions
2. EDFD 5373 Psych. Foundations of Teaching and Learning
EDFD 5573 Life-Span Human Development
3. EDFD 5303 Historical Foundations of Modern Education
EDFD 5353 Philosophy of Education
EDFD 5683 Issues in Educational Policy

The M.Ed. in Special Education prepares teachers for teaching students with exceptionalities including (a) Disabilities or (b) Gifted Education. The M.Ed. in Disabilities requires a minimum of 21 credit hours in specific disability areas and three credit hours in research in special education. The program in Gifted Education requires a minimum of 36 credit hours including the following 21 credit hours of Gifted Education course work:

- CIED 5803 Nature and Needs of the Gifted and Talented
- CIED 5813 Curriculum Development in Gifted Education
- CIED 5823 Gifted and Talented (Structured) Practicum
- CIED 5833 Gifted and Talented (Flex) Practicum
- CIED 599V Special Topics: Social and Emotional Components of the GT Student (3 credit hours)
- CIED 641V Special Topics: Differentiated Instruction for Academically Diverse Learners (3 credit hours)
- CIED 6073 Seminar: Developing Creativity

Graduate Certificate Program in Applied Behavior Analysis (APBA):

The Graduate Certificate in Applied Behavior Analysis is for those individuals with a master's degree in teaching or related services who wish to pursue board certification in Behavior Analysis or to utilize behavioral theory in the area of autism or behavioral disorders. The program builds on candidate's previous knowledge of effective teaching and behavioral strategies and extends knowledge and skills in the use of applied behavior analysis (ABA), positive behavior support (PBS), and functional behavioral assessments (FABs) in teaching persons with low incidence or severe disabilities. Classes emphasize the development and ethical use of behavioral change programs which are validated by systematic evaluation of the interventions used. Ethical, professional and legal standard are discussed and applied in the use of Applied Behavior Analysis.

Admission requirements for the Graduate Certificate program include:

- A minimum of a 3.0 cumulative grade point average (GPA) during the last 60 hours of undergraduate work.
- A master's degree in a related field.
- Previous graduate course work must include (a) 3 semester hours in research design/methods and (b) 3 semester hours in applied behavior psychology or learning theories.

Program of Study:

- CIED 6843 Basic Principles of ABA
 - CIED 6853 Assessment in ABA
 - CIED 6863 Behavioral Change Procedures and Supports
 - CIED 6873 Measurement and Experimental Design
 - CIED 6883 Ethical, Professional, and Legal Standards
- Candidates for the Graduate Certificate must have a B or better in the Program of Study. Courses from other institution will not be substituted for the required courses. Candidates seeking Board Certification will need to pass the BACB™ examination and to arrange for a Board Supervised Practicum. Information on Board Certification is available online at www.babc.com.

Graduate Certificate Program in Autism Spectrum Disorders (AUTS):

The graduate certificate in Autism Spectrum Disorders develops professionals in the area of autism spectrum disorders. The program recognizes students who take a concentrated core of courses focused on autism spectrum disorders. Students who earn the certificate develop knowledge and skills in the areas of characteristics, assessment, and educational interventions for individuals with autism spectrum disorders.

Program of Study:

- CIED 6803 Teaching Students with Autism Spectrum Disorders
- CIED 6813 Assessment of Students with Autism Spectrum Disorders
- CIED 6823 Instructional Methods for Students with Autism Spectrum Disorders
- CIED 6833 Practicum in Autism Spectrum Disorders
- CDIS 5143 Cognitive-Communication Development and Disorders

DRAMA (DRAM)

D. Andrew Gibbs
Department Chair
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<http://www.uark.edu/depts/drama/>

- Professors Gibbs, Herzberg, Martin, Riha, Wade
- Associate Professors Dwyer, Landman
- Assistant Professors Sibley, Stone
- Instructor Leftwich
- Visiting Assistant Professors Ford, Frank, Hicks

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.

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 up to 6 hours of degree credit.

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 (Irregular) 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 (Irregular) 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.

DRAM4833 Scene Painting I (Irregular) A studio class in painting techniques for the theatre. Exercises in color, textures, styles, and execution. Prerequisite: DRAM 1323/1321L or enrolled in Drama MFA program. May be repeated for up to 6 hours of degree credit.

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 up to 12 hours of degree credit.

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 (Irregular) 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. May be repeated for up to 6 hours of degree credit.

DRAM5143 History of Decor for the Stage (Irregular) 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.

DRAM5183 Scene Design Studio (Fa) Individual and advanced projects in designing scenery for various theatrical genres as well as non-theatrical applications with emphasis on the design process involving playwright analysis, text analysis, and research. Collaboration skills and advanced rendering techniques will be explored. Contributes to on-going portfolio development. Prerequisite: DRAM 3653 or instructor consent. May be repeated for up to 6 hours of degree credit.

DRAM5193 Scene Technology Studio (Sp) Individual and advanced projects in scenic techniques with emphasis on scene painting, drafting, rendering, properties design, or scenic crafts as determined by student need. Contributes to on-going portfolio development. Prerequisite: Graduate standing or instructor consent. May be repeated for up to 9 hours of degree credit.

DRAM5213 Costume Design (Irregular) 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 (Irregular) Advanced methods of costume construction techniques and the practice of theatrical pattern drafting will be explored through project work.

DRAM5283 Costume Design Studio (Fa) Individual and advanced projects in designing costumes for various theatrical genres with emphasis on the design process involving text interpretation, character analysis, and research. Collaboration skills and advanced rendering techniques will be explored. Contributes to on-going portfolio development. Prerequisite: DRAM 3213 or DRAM 5213 or instructor consent.

DRAM5293 Costume Technology Studio (Sp) Individual and advanced projects in costume construction and techniques with emphasis on flat pattern, draping, corsetry, tailoring or costume crafts as determined by student need. Contributes to on-going portfolio development. Prerequisite: Graduate standing or instructor consent. May be repeated for up to 9 hours of degree credit.

DRAM5353 Stage Lighting Technology (Irregular) 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.

DRAM5383 Lighting Technology Studio (Sp) Individual and advanced projects in lighting technology with emphasis on light sources, lighting control, equipment design and specification and the mechanics of lighting. Contributes to on-going portfolio development. Prerequisite: Graduate standing or instructor consent. May be repeated for up to 9 hours of degree credit.

DRAM5393 Lighting Design Studio (Fa) Individual projects in lighting design with emphasis on the design process involving script interpretation, design aesthetics and research. Lighting design applications to a variety of venues will be studied. Contributes to on-going portfolio development. Prerequisite: Graduate standing or instructor consent. May be repeated for up to 6 hours of degree credit.

DRAM542V Graduate Acting Studio (Irregular) (1-3) Provides actors with intensive opportunities to explore specific aspects of their craft. Sample topics include characterization, Chekhov, Pinter, Brecht, improvisation and mask work. Topics vary each semester. Pre- or Corequisite: DRAM 5413. Prerequisite: Graduate standing in Drama. May be repeated for up to 18 hours of degree credit.

DRAM5432 Graduate Voice and Speech I (Fa) Teaches how to build clear vocal production using proper breath support, grounded in the Alexander technique. Emphasis on the connection between breath and thought, learning to undo inadequate vocal habits, and vocal hygiene. Prerequisite: Graduate standing in Drama. May be repeated for up to 4 hours of degree credit.

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.

DRAM545V Musical Theatre Performance (Irregular) (1-3) 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 (Irregular) 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.

DRAM548V Meisner Technique I (Irregular) (1-3) Acting theory and exercises of Sanford Meisner, including repetition work, connecting with partner, three moment game, activities, and emotional preparation.

DRAM549V Meisner Technique II (Irregular) (1-3) Continuation of Meisner Technique I. Incorporation of theory and advanced exercises of the Meisner Technique into the playing of text. Prerequisite: DRAM 548V.

DRAM5501 Research Techniques in Drama (Odd years, 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.

DRAM5533 Graduate Playwriting: Special Projects (Irregular) 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 up to 6 hours of degree credit.

DRAM5543 Creating a One-Person Show (Irregular) Actors learn to use compelling personal experiences and interests in the creation of a unique one-person show. Includes exploration in characterization, staging and playwriting. Culminates in the public presentation of a short one-person show. Prerequisite: Graduate standing in Drama.

DRAM5552 Graduate Voice and Speech II (Sp) A continuation of Graduate Voice and Speech I, exploring more closely the connection between breath support and volume, pitch, range, resonance and articulation. Prerequisite: DRAM 5432.

DRAM5562 Graduate Voice and Speech III (Irregular) Continuation of Graduate Voice

and Speech II, focusing on the classification of vowels and consonants according to the International Phonetic Alphabet (IPA). Prerequisite: DRAM 5552.

DRAM5572 Graduate Voice and Speech IV (Irregular) Continuation of Graduate Voice and Speech III. Extension of the application of the IPA to the analysis of different accents of individuals for whom English is a second language. Approximately eight dialects of English will be examined. Prerequisite: DRAM 5562.

DRAM5593 Acting and Directing Absurdist Theatre (Irregular) This course focuses on a particular dramatic style that developed following World War II: Absurdism. In scene presentation projects, students will grapple with the unusual challenges acting and directing these plays, as well as explore the cultural contexts, philosophies and theatrical traditions that led to their invention. Prerequisite: Graduate standing in Drama.

DRAM5613 Graduate Directing Principles (Irregular) 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 (Irregular) (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 up to 9 hours of degree credit.

DRAM5663 Directing Modern Drama (Irregular) Studio course exploring the challenges of directing post-19th Century dramatic literature. Individual projects in collaboration with actors. Sample dramatic literature includes styles such as Realism, Expressionism, Absurdism, post-Modernism and Epic Theatre. Topics vary each semester. Prerequisite: Graduate standing in Drama. May be repeated for up to 12 hours of degree credit.

DRAM5673 Adapting and Directing Non-Theatrical Texts (Irregular) Offers directors practice in the adaptation and staging of non-theatrical prose, poetry and current events. Individual projects in collaboration with actors. Prerequisite: Graduate standing in Drama.

DRAM5683 Directing Studio (Sp, Fa) Hands-on exploration into the direction of historical and contemporary texts and styles, including Greek, Roman, Shakespeare, Realism, American and international scripts and the adaptation of non-theatrical material. Topics vary each semester. Includes discussion and investigation of the theatrical arts and collaborative and production processes. Prerequisite: MFA Directing student or instructor consent. May be repeated for up to 6 hours of degree credit.

DRAM5691 Scene Study for Directing Studio (Sp, Fa) Participation as an actor in scenes presented for the graduate Directing Studio course. Varying historical and contemporary texts and styles each semester. Class meets one hour each week, plus outside rehearsals, depending on casting. Prerequisite: Instructor consent. May be repeated for up to 4 hours of degree credit.

DRAM5713 Directing Classics (Irregular) Explores the challenges of directing classic texts. Individual projects in collaboration with actors on a wide variety of pre-20th Century dramatic literature. Topics vary each semester. Prerequisite: Graduate standing in Drama. May be repeated for up to 12 hours of degree credit.

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.

DRAM5763 Dramatic Criticism (Irregular) 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.

DRAM5783 Viewpoints (Irregular) Exploration and application of the Viewpoints movement technique. Prerequisite: Graduate standing in Drama.

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 up to 6 hours of degree credit.

DRAM590V Independent Study (Sp, Su, Fa) (1-18) Individually designed and conducted programs of reading and reporting under guidance of a faculty member. May be repeated for up to 18 hours of degree credit.

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.

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 185.

EDUCATION REFORM, DEPARTMENT OF (EDRE)

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<http://www.uark.edu/ua/der/>

- Professors Costrell, Greene, Greenwood, Maranto, Ritter, Stotsky, Wolf

Degrees Conferred:

Ph.D. in Education Policy (EDPO)

The Ph.D. in Education Policy is designed to prepare policy-oriented scholars for careers in academia, think tanks, and public service in the field of K-12 education policy. The program of study is based on the social sciences and other academic disciplines, supported by empirical research. The program has five components: (i) core courses to establish the disciplinary base and intellectual framework; (ii) research methods to prepare for empirical work; (iii) field seminars in the key education reform fields, to understand and contribute to research behind key policy debates; (iv) electives to pursue further specialization; and (v) dissertation, following completion of comprehensive exams.

Admission to the Program: In addition to meeting University requirements for admission to the Graduate School, applicants should have combined GRE scores of 1100, writing score of 5.0, and minimum GPA of 3.0 undergraduate or 3.5 in a masters' program. Admission is based on the individual's total profile, with special attention given to those with professional experience in education policy. Those students who have completed calculus and statistics courses prior to arriving on campus will more readily satisfy the prerequisites for the program's research methods sequence.

Program of Study

Core courses: (15 hours):

EDFD 5353 Philosophy of Education
EDRE 6023 Economics of Education
EDRE 6033 Politics of Education
EDRE 6043 Finance and Education Policy
EDRE 6053 Measurement of Educational Outcomes

Research Methods (12 hours):

ECON 5613/AGEC 5613 Econometrics I
ECON 6623/AGEC 5623 Econometrics II
EDRE 6213/EDFD 6613 Program Evaluation and Research Design
EDRE 6223 Research Seminar

Education Reform Fields (15 hours):

EDRE 6413/EDFD 5683 Issues in Education Policy
EDRE 6423 Seminar in School Choice Policy

- EDRE 6433 Seminar in Education Accountability Policy
- EDRE 6443 Seminar in Education Leadership Policy
- EDRE 6453 Seminar in Teacher Quality and Public Policy

Electives (12 hours):

Students will take four electives, which typically will be a combination of relevant course offerings in other departments and directed research projects. The specific electives will all be subject to approval of the Education Policy graduate director, and may include subjects such as education law, qualitative methods, advanced quantitative methods, organizational theory, etc. Directed research projects could be either of the student's own design or within the context of one of the various research projects underway in the Department of Education Reform.

Dissertation (18 hours):

EDRE 700V

Students will take a written qualifying examination after the spring term of the first year, covering research methods, with applications to the first-year content courses. The field exams, with both written and oral components, will ordinarily be taken in the fall or spring of the third year, covering the student's choice of two fields.

Education Reform (EDRE)

EDRE559V Field Research (Irregular) (1-6) Directed graduate-level field research in education policy settings. Prerequisite: Approval of EDRE Graduate Director. May be repeated for up to 6 hours of degree credit.

EDRE6023 Economics of Education (Odd years, Sp) This course applies the principles of economic analysis to education and education reform. Topics include: Human capital and signaling theories; education labor markets; educational production functions; public policy and market forces. The course also features empirical evidence evaluating economic theories of education.

EDRE6033 Politics of Education (Sp) This course explores historical and institutional forces that help shape education policymaking. Particular attention will be paid to the experience of past education reform movements as well as the influence of interest groups, federalism, bureaucracy, governance structures, public opinion, and judicial review on education policy.

EDRE6043 Finance and Education Policy (Even years, Sp) This course examines K-12 education finance from the standpoint of education reform policy. The tools of analysis include economics, public finance, law and political science. Topics include: revenue sources and fiscal federalism, standards-based reform and school finance, school funding formulas, adequacy lawsuits, the politics of school funding, school funding and markets. The course also features empirical evidence on the educational impact of education finance.

EDRE6053 Measurement of Educational Outcomes (Fa) This course will train students to consider the various types of outcome and assessment measures used for education at the K-12 level throughout the United States; further, the students will engage in analyses of research that relies on these various outcome measures.

EDRE6213 Program Evaluation and Research Design (Fa) This course provides students with training in the methods used to generate evidence-based answers to questions regarding the efficacy and impacts of education programs. The central questions that motivate most educational program evaluations are: (1) What is the problem? (2) What policies or programs are in place to address the problem? (3) What is their effect? (4) What works better? (5) What are the relative benefits and costs of alternatives? (Same as ESRM 6613)

EDRE6223 Research Seminar in Education Policy (Fa) This course provides students with the opportunity to learn about education policy research by interacting directly with the leading scholars and practitioners in the field. Students will also gain a foundation in the field of education policy research by reading and discussing some of the founding works of the field.

EDRE636V Special Problems (Irregular) (1-6) Independent reading and investigation in education policy under faculty supervision. Prerequisite: Approval of EDRE Graduate Director. May be repeated for up to 6 hours of degree credit.

EDRE6413 Issues in Education Policy (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. In great measure, the goals of the course will be accomplished through the consideration of opposing stances on key educational policy debates and issues that are of current import.

EDRE6423 Seminar in School Choice Policy (Even years, Fa) This course examines parental school choice - perhaps the most controversial education reform of our age. Students will be introduced to the full set of school choice policies, including charter schools and vouchers, and evaluate their benefits and drawbacks as educational interventions.

EDRE6433 Seminar in Education Accountability Policy (Odd years, Sp) This course examines K-12 school and district accountability under state and Federal law (e.g. NCLB), as well as teacher and student accountability (e.g. exit exams). Topics include the theory of incentives and politics of tradeoffs, measurement issues of policy implementation, and statistical evidence on policy effects on performance.

EDRE6443 Seminar in Education Leadership Policy (Odd years, Fa) This course will examine the individual and systemic prerequisites of effective leadership of schools and school systems, and effective leadership techniques. It will consider the differences between public and private sector leadership. It will also explore ways to identify effective and ineffective leaders, and design and evaluate systems to recruit and train the former and reassign the latter.

EDRE6453 Seminar in Teacher Quality and Public Policy (Even years, Sp) Examines how our public system of education shapes the preparation and continued professional development of K-12 teachers, and how that system has been influenced by standards-based education reform as well as efforts to enhance the quality of teaching and learning in public schools. Uses education reform legislation in several states as case studies to illustrate the successes and pitfalls of attempts to reform teacher education and licensure through public policy.

EDRE674V Internship in Education Policy (Irregular) (1-6) Internship at a public or private

entity involved in the making or implementation of education policy. Paper required on a significant aspect of the internship experience. Prerequisite: Approval of EDRE Graduate Director.
EDRE699V Special Topics (Irregular) (1-3) Topics vary depending on instructor. Prerequisite: Approval of EDRE Graduate Director. May be repeated for up to 9 hours of degree credit.
EDRE700V Doctoral Dissertation (Irregular) (1-18) Doctoral Dissertation. Prerequisite: Candidacy. May be repeated for up to 18 hours of degree credit.

EDUCATIONAL FOUNDATIONS (EDFD)

See Educational Statistics and Research Methods, Department of Curriculum and Instruction, page 92.

EDUCATIONAL LEADERSHIP (EDLE)

See listing in the Department of Curriculum and Instruction, page 95.

EDUCATIONAL STATISTICS AND RESEARCH METHODS (ESRM)

George Denny
 Program Leader
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- Professors Denny, Lucas, Mulvenon, Stegman
- Associate Professor Turner
- Assistant Professors Dunn, Lo

<http://esrm.uark.edu>

Degrees Conferred:

M.S. in Educational Statistics and Research Methods (ESRM)
 Ph.D. in Educational Statistics and Research Methods (ESRM)

Graduate Certificates Offered (non-degree):

- Educational Program Evaluation (EDEV)
- Educational Psychology (EPSY)
- Educational Measurement (EDME)
- Educational Statistics and Research Methods (ESRM)

The Educational Statistics and Research Methods 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 Educational Statistics and Research Methods: In addition to meeting University requirements for admission to the Graduate School, applicants must have earned a bachelor's degree with at least a 3.0 cumulative GPA on the last 60 hours of the baccalaureate degree and minimum scores on the Graduate Record Examinations the 48th percentile Verbal, the 56th percentile Quantitative and the 29th percentile on Analytic Writing. Higher performance on the quantitative component of the GRE may compensate for a lower GPA in admissions decisions.

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):

ESRM 5013 Research Methods in Education
 EDFD 5353 Philosophy of Education
 EDFD 5373 Psychological Foundations of Teaching & Learning
 ESRM 5393 Statistics in Education and Health Professions
 ESRM 5653 Educational Assessment
 EDFD 5683 Issues in Educational Policy
 One course from the following (3 hours):
 EDFD 5303 Historical Foundations of Modern Education
 EDFD 5573 Life-Span Human Development

In addition to the courses listed, students are also required to complete these independent research requirements of ESRM 668V Research Practicum (3 hours) and ESRM 600V Master's Thesis (6 hours), as well as 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 minimum scores on the Graduate Record Examinations at the 48th percentile Verbal, the 56th percentile Quantitative and the 29th percentile on Analytic Writing 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:
 ESRM 6403 Educational Statistics and Data Processing
 ESRM 6413 Experimental Design in Education
 ESRM 6613 Evaluation of Policies, Programs, and Projects
 ESRM 6533 Qualitative Research
 ESRM 6633 Seminar: Survey Research Methods
 One course from the following (3 hours):
 ESRM 6423 Multiple Regression Techniques for Education
 ESRM 6453 Applied Multivariate Statistics
 ESRM 6543 Advanced Qualitative Research
 ESRM 6653 Measurement and Evaluation
 ESRM 699V Seminar (approved by ESRM faculty)

Graduate Certificate in Educational Psychology: The graduate certificate in Educational Psychology recognizes students who take a concentrated core of courses focused on educational psychology. Students who earn this certificate develop a foundational understanding of educational psychology theories, application of theory to educational practices and evaluation, and methods for identifying issues that arise in the learning process for learners of all ages.

Program of Study:
 EDFD 5373 Psychological Foundations of Teaching and Learning
 EDFD 5573 Lifespan of Human Development
 EDFD 5673 Principles of Motivation
 EDFD 5773 Advanced Topics in Educational Psychology
 Two courses from the following (6 hours):
 ESRM 6413 Experimental Design
 ESRM 6423 Multiple Regression Techniques for Education
 ESRM 6653 Measurement and Evaluation

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:
 ESRM 5653 Educational Assessment
 ESRM 6403 Educational Statistics and Data Processing
 ESRM 6653 Measurement and Evaluation
 ESRM 6753 Advanced Measurement
 One course from the following (3 hours):
 ESRM 6613 Evaluation of Policies, Programs, and Projects
 ESRM 6633 Seminar: Survey Research Methods
 And one course from the following (3 hours):
 ESRM 6413 Experimental Design
 ESRM 6423 Multiple Regression Techniques for Education

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:
 ESRM 6403 Educational Statistics and Data Processing
 ESRM 6413 Experimental Design in Education
 ESRM 6423 Multiple Regression Techniques for Education
 ESRM 6453 Applied Multivariate Statistics
 One course from the following (3 hours):
 ESRM 5653 Educational Assessment
 ESRM 6653 Measurement and Evaluation
 And one course from the following (3 hours):
 ESRM 6513 Advanced Experimental Design
 ESRM 6523 Advanced Multiple Regression
 ESRM 6553 Advanced Multivariate Statistics
 ESRM 699V Advanced Statistics Seminar: Approved by ESRM Faculty

Doctor of Philosophy in 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 Statistics and Research Methods 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 and scores on the Graduate Record Examinations at the 48th percentile Verbal, the 65th percentile Quantitative and the 48th percentile on Analytic Writing. Higher performance on the quantitative component of the GRE may compensate for a lower GPA in admissions decisions.

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

ESRM 6403 Educational Statistics and Data Processing

ESRM 6413 Experimental Design in Education

ESRM 6423 Multiple Regression Techniques for Education

ESRM 6453 Applied Multivariate Statistics

ESRM 6513 Advanced Experimental Design

ESRM 6523 Advanced Multiple Regression

ESRM 6533 Qualitative Research

ESRM 6553 Advanced Multivariate Statistics

ESRM 6613 Evaluation of Policies, Programs and Projects

ESRM 6653 Measurement and Evaluation

9 Hours of Elective Courses from the following:

ESRM 5653 Educational Assessment

ESRM 6633 Survey Research Methods

ESRM 6753 Advanced Measurement

ESRM 699V Seminar: Categorical Data Analysis (3 hours)

ESRM 699V Seminar: Structural Equation Modeling (3 hours)

Other Math Department and Quantitative Courses approved by ESRM

Faculty

18 hours of ESRM 700V Doctoral Dissertation

Educ Stats & Research Methods (ESRM)

ESRM5013 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.

ESRM5393 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.

ESRM5653 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.

ESRM599V Seminar (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

ESRM600V Master's Thesis (Sp, Su, Fa) (1-6) May be repeated for up to 6 hours of degree credit.

ESRM605V Independent Study (Sp, Su, Fa) (1-6)

ESRM6403 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: ESRM 5013 or equivalent.

ESRM6413 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: ESRM 6403 or equivalent.

ESRM6423 Multiple Regression Techniques for Education (Fa) Introduction to multiple regression procedures for analyzing data as applied in educational settings, including multicollinearity, dummy variables, analysis of covariance, curvi-linear regression, and path analysis. Prerequisite: ESRM 6403.

ESRM6453 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: ESRM 6413.

ESRM6513 Advanced Experimental Design (Irregular) 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: ESRM 6413.

ESRM6523 Advanced Multiple Regression (Irregular) 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: ESRM 6423.

ESRM6533 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: ESRM 6403.

ESRM6543 Advanced Qualitative Research (Sp) Preparation for the conduct of qualitative research, structuring, literature reviews, data collection and analysis, and reporting results. Prerequisite: ESRM 6533. May be repeated for up to 6 hours of degree credit.

ESRM6553 Advanced Multivariate Statistics (Irregular) 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: ESRM 6453.

ESRM6613 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. Prerequisite: ESRM 6403. (Same as EDRE 6213)

ESRM6623 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. Prerequisite: ESRM 6403.

ESRM6633 Survey Research Methods (Even years, Sp) The course addresses all phases of conducting a survey research study, including conceptualization, sample selection, instrument development, and analysis and reporting of findings. Prerequisite: ESRM 6403.

ESRM6653 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: ESRM 6403.

ESRM668V Practicum in Research (Irregular) (1-6) Practical experience in educational research on campus, in school systems, or in other agencies in educational program development.

ESRM6753 Advanced Measurement (Odd years, Sp) Topics of measurement in the psychometric field focusing on modern test theory; item level and test level analyses including differential item functioning, test dimensionality, item response theory; computer adaptive testing, equating, and general evaluation and usage of measurement instruments. Prerequisite: ESRM 6653.

ESRM699V Seminar (Irregular) (1-6) Prerequisite: advanced graduate standing. May be repeated for up to 6 hours of degree credit.

ESRM700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

Educational Foundations (EDFD)

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.

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.

EDFD5573 Life-Span Human Development (Sp, Su, Fa) Basic principles of development throughout the human life-cycle. Physical, cognitive, social, emotional, and personality development.

EDFD5673 Principles of Motivation (Sp) This course focuses on theories and concepts of human motivation. Students explore what motivates students to learn and examine strategies, techniques, and interventions that promote and sustain learner motivation.

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.

EDFD5773 Advanced Topics in Educational Psychology (Even years, Fa) This course provides an opportunity for advanced study of socio-cognitive variables that play a crucial role in working in administration, teaching, and the evaluation of the success of students and academic programs. Prerequisite: ESRM 6403 and EDFD 5373.

EDUCATIONAL TECHNOLOGY (ETEC)

See the listing in the Department of Curriculum and Instruction, page 89.

ELECTRICAL ENGINEERING (ELEG)

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 Graduate Program Coordinator
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<http://www.ee.uark.edu/> or <http://www.eleg.uark.edu/>

- Distinguished Professors El-Ghazaly, Mantooth, Varadan (V.K.), Varadan (V.V.)
- University Professor Balda
- Professors Ang, El-Shenawee, Manasreh, Mantooth, Martin, McCann, Naseem, Rankin
- Associate Professors Brown (R.L.), Smith
- Assistant Professors Wu, Yu
- Instructor Overbey
- Adjunct Distinguished Professors Salamo, Xiao
- Adjunct University Professor Selvam
- Adjunct Professors Malshe, Ulrich, Vickers
- Adjunct Associate Professors Bajwa, Di, Parkerson, Thompson, Tian
- Adjunct Assistant Professors Li, McNutt

Degrees Conferred:

M.S.E.E. (ELEG)
 M.S.E., Ph.D. in Engineering (ENGR) (See Engineering)

Primary Areas of Faculty Research: Computer-aided design (CAD); computer architecture and microprocessors; control systems and motion control; design, modeling, and testing of analog, digital, and mixed signal circuits; digital signal processing and image processing; electronic packaging, sensors, smart materials and structures and micro-electro mechanical (MEMS) systems; embedded control systems; microelectronics, including solid state physics, processing, integrated circuit design, solar cells, and semiconductor nanostructures; semiconductor materials for optoelectronic applications; microwave design; microwave imaging; neural networks and pattern recognition; neuroelectronics and neurosurgery; power electronics, including design of motors and generators, motor controls, and power distribution; radar and computational electromagnetics; sensor networks; telecommunications, including wireless communications and computer networking.

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. Students who complete a B.S. degree in Electrical Engineering at the University of Arkansas, Fayetteville, with a GPA of 3.5 or greater may count toward the M.S. degree up to 6 hours of ELEG graduate-level course work completed as an undergraduate student.
5. 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 42 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 42 hours of course work (excluding thesis and dissertation hours) must be presented in the combined M.S. and Ph.D. programs..
 - b. 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.
 - c. 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.
 - d. The course work specified in item (a) must include GRSD 5003 or MEPH 5383.
 - e. The doctoral program must include at least 72 hours of course work and thesis or dissertation hours. A maximum of six of these hours may be thesis hours. The remaining hours that are not course work must be dissertation. The Graduate School requires a minimum of 18 hours of dissertation for graduation.
 - f. It is emphasized that the course work specified above represents 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.
6. Candidates for the M.S.E.E. degree 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 may be required to take whatever undergraduate courses are deemed necessary in addition to the graduate courses specified in items 1-3.
7. The M.S.E.E. degree includes a distance education option for which students complete most or all of their course work using distance education courses. The use of this option is subject to

approval by the student's major professor, and to the availability of sufficient distance education courses in the student's specialty areas to enable completion of the M.S.E.E.

8. The M.S.E.E. degree will allow transfer of up to nine credit hours of graduate-level coursework from universities with which the University of Arkansas has a "1+1" M.S.E.E. exchange program. Each course transferred must be graduate level and must be approved for transfer by the Electrical Engineering Graduate Committee. The transferred courses will not count toward the M.S.E.E. requirement for 5000 or 6000 level ELEG courses.
9. Other conditions as stipulated in departmental guidelines for master's and doctoral degrees.

Electrical Engineering (ELEG)

ELEG4213 MEMS and Microsensors (Fa) The aim of this course is to teach the theory and developments in MEMS, microsensors, NEMS and smart devices and to train the students for the fabrication using microfabrication tools in the clean room. The students will design, fabricate and characterize a MEMS/microsensor device during the lab hours at the HIDEc clean room.

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.

ELEG4253 Nanotechnology (Irregular) The objective of this course is to present a concise and concurrent introduction to Nanotechnology and its applications in engineering and medicine, particularly for nanoelectronics, nanosensors and nanocomputing. This course presents basic aspects of the nanotechnology, its fabrication and imaging technologies and integration of biomolecules with electronic systems for the design of devices in nanoelectronics, nanobioelectronics and Nanomedicine. Prerequisite: Senior standing or instructor permission. May be repeated for up to 6 hours of degree credit.

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.

ELEG4303 Introduction to Nanomaterials and Devices (Irregular) This course provides the students with an introduction to nanomaterials and devices. The students will be introduced to the quantization of energy levels in nanomaterials, growth of nanomaterials, electrical and optical properties, and devices based on these nanomaterials, such as tunneling resonant diodes, transistors, detector, and emitters. Graduate students will be given additional or different assignments. Graduate students will be expected to explore and demonstrate an understanding of the material with a greater level of depth and breadth than the undergraduates. Each group of students will have different expectations and grading systems. The instructor will prepare and distribute two distinct syllabi. Corequisite: ELEG 4203. Prerequisite: ELEG 3213 and PHYS 2074. May be repeated for up to 6 hours of degree credit.

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.

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 3924 and ELEG 3124.

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. Pre- or Corequisite: ELEG 4143.

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 up to 6 hours of degree credit.

ELEG4963 CPLD/FPGA Based System Design (Irregular) Field Programmable logic devices (FPGAs/CPLDs) have become extremely popular as basic building blocks for digital systems. They offer a general architecture that users can customize by inducing permanent or reversible physical changes. This course will deal with the implementation of logic options using these devices. Corequisite: Lab component. Prerequisite: ELEG 2913. (Same as CSCE 4353)

ELEG4963H Honors CPLD/FPGA Based System Design (Irregular) Field Programmable logic devices (FPGAs/CPLDs) have become extremely popular as basic building blocks for digital systems. They offer a general architecture that users can customize by inducing permanent or reversible physical changes. This course will deal with the implementation of logic options using these devices. Corequisite: Lab component. Prerequisite: ELEG 2913.

ELEG4983 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. Prerequisite: ELEG 3923. (Same as CSCE 4213)

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 3124.

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.

ELEG5203 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. Students may not receive credit for both ELEG 4203 and ELEG 5203. Prerequisite: Graduate standing.

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 metallization. Design and analysis of device fab-

rication 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.

ELEG5223 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. Students cannot receive credit for both ELEG 4223 and ELEG 5393. Prerequisite: ELEG 4203 or ELEG 5203. (Same as ELEG 4223)

ELEG5243L Microelectronic Fabrication Techniques and Procedures (Irregular) The Thin-Film Fabrication course is designed to prepare students to use the thin-film equipment and processes available at the Engineering Research Center's thin-film cleanroom. The process modules to be trained on include lithography, metal deposition and etching, oxide deposition, growth and etching, reactive dry etching, tantalum anodization, photodefinable spin-on dielectric and electroplating. The related metrology modules include microscope inspection, spectrophotometric measurement of oxide, profilometry and four-point probe measurements. Prerequisite: ELEG 5273.

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 in-depth coverage of topics from ELEG 4233, and design of very large scale chips. Prerequisite: ELEG 4233.

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 cannot be earned for both MEEG 5273 and ELEG 5273. Prerequisite: (ELEG 3213 or ELEG 3913) and MATH 2584. (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 Semiconductor 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.

ELEG5343 Organic Electronics Technology (Irregular) Students become familiar with recent developments in and process technology for organic material based devices and sensors in the classroom, but also gain hands on experience with fabrication processes using micro-fabrication tools in the lab.

ELEG5403 Control Systems (Irregular) Mathematical modeling of dynamic systems, stability analysis, control systems architectures and sensor technologies. Time-domain and frequency-domain design of feedback control systems: lead, lag, PID compensators. Special topics on microprocessor implementation. Credit not given for both ELEG4403 and ELEG5403. Prerequisite: Graduate standing or ELEG 3123.

ELEG5413 Modern Control Systems (Irregular) A second course in linear control systems. Emphasis on multiple-input and multiple-output systems: State-space analysis, similarity transformations, eigenvalue and eigenvector decomposition, stability in the sense of Lyapunov, controllability and observability, pole placement, quadratic optimization. Credit not given for both ELEG 4413 and ELEG 5413. Prerequisite: ELEG 5403 or equivalent.

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-discrete 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 Biomedical Control Systems (Irregular) Study of control systems analysis and design as applied to human physiological systems: Modeling and dynamics of biological processes, biomedical sensors, time and frequency domain analysis, identification of physiological systems. Overview of medical device regulations. Prerequisite: ELEG 4403 or equivalent.

ELEG5473 Power System Dynamics (Irregular) Modeling, dynamics, and stability analysis of three-phase electric power systems; Design and implementation of control systems that respond to load fluctuations and fault conditions; Integration of distributed energy sources such as wind and solar power; Overview of the related industry and government regulations for power system protection and reliability. Prerequisite: ELEG 3124 and ELEG 3304 or equivalent.

ELEG5503 Design of Advanced Power Distribution Systems (Irregular) ELEG 5503 Design of Advanced Power Distribution Systems. 3 credit hours.

Design considerations of electric power distribution systems, including distribution transformer usage, distribution system protection implementation, primary and secondary networks design, applications of advanced equipment based on power electronics, and use of capacitors and voltage regulation. Students cannot receive credit for both 4503 and 5503. Prerequisite: ELEG 3304.

ELEG5513 Power Systems Analysis (Irregular) Modeling and analysis of electric power systems: Energy sources and conversion; load flow analysis; reference frame transformations; symmetrical and unsymmetrical fault conditions; load forecasting and economic dispatch. Credit not given for both ELEG 4513 and ELEG 5513. Prerequisite: Graduate standing

ELEG5523 Electric Power Quality (Irregular) The theory and analysis of electric power quality for commercial, industrial and residential power systems. Specific topics include harmonics,

voltage sags, wiring and grounding, instrumentation, distributed generation and power electronic systems, and site surveys. Case studies complement the theoretical concepts. Prerequisite: ELEG 3303 or graduate standing.

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).

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 CSCE 5613)

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 (Irregular) 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 for credit.

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.

ELEG5703 RF & 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. Selected topics for device fabrication and measurements will be covered. Cannot get credit if student has taken ELEG 4703. Prerequisite: ELEG 3704.

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 3704 and ELEG 4703 or ELEG 5703.

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 3704.

ELEG5773 Electronic Response of Biological Tissues (Irregular) Understand the electric and magnetic response of biological tissues with particular reference to neural and cardiovascular systems. Passive and active forms of electric signals in cell communication. We will develop the central electrical mechanisms from the membrane channel to the organ, building on those that are common to many electrically active cells in the body. Analysis of Nernst equation, Goldman equation, linear cable theory, and Hodgkin-Huxley Model of action potential generation and propagation. High frequency response of tissues to microwave excitation, dielectric models for tissue behavior, Debye, Cole-Cole models. Role of bound and free water on tissue properties. Magnetic response of tissues. Experimental methods to measure tissue response. Applications to Electrocardiography & Electroencephalography, Microwave Medical Imaging, RF Ablation will be discussed. Students may not receive credit for both ELEG 4773 and ELEG 5773. Prerequisite: MATH 2584, ELEG 3704 or PHYS 3414, BIOL 2533 or equivalent. (Same as BENG 5283)

ELEG5783 Introduction to Antennas (Irregular) Basic antenna types: small dipoles, half wave dipoles, image theory, monopoles, small loop antennas. Antenna arrays: array factor, uniformly excited equally spaced arrays, pattern multiplication principles, nonuniformly excited arrays, phased arrays. Use of MATLAB programming and mathematical techniques for antenna analysis and design. Emphasis will be on using simulation to visualize variety of antenna radiation patterns. Students cannot get credit for ELEG 5783 if they have taken ELEG 4783. Prerequisite: ELEG 3704.

ELEG5801 Written and Oral Communication (Sp, Su, Fa) This course is designed to improve the oral presentations and technical writing of graduate students. Emphasis is placed on writing journal articles, theses and dissertations, and on giving oral presentations at conferences and job interviews. Each student delivers a 20 minute PowerPoint presentation to other students in the class. Prerequisite: Readiness to begin writing thesis

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 up to 3 hours of degree credit.

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 up to 6 hours of degree credit.

ELEG5914 Advanced Digital Design (Irregular) To master advanced logic design concepts, including the design and testing of synchronous and asynchronous combinational and sequential circuits using state of the art CAD tools. Students may not receive credit for both ELEG 5914 and ELEG/CSCE 4914. Corequisite: Lab component. Prerequisite: ELEG 2904 or CSCE 2114.

ELEG5923 Introduction to Integrated Circuit Design (Fa) Design and layout of large scale digital integrated circuits using CMOS technology. Topics include MOS devices and basic circuits, integrated circuit layout and fabrication, dynamic logic, circuit design, and layout strategies for large scale CMOS circuits. Students may not receive credit for both ELEG 4233 and ELEG 5923. Prerequisite: ELEG 3213 or ELEG 3933 and MATH 2584. (Same as CSCE 4333, ELEG 4233)

ELEG5993 Mixed-signal Modeling and Simulation (Regular) Study of basic analog, digital & mixed signal simulation solution methods. Modeling with hardware description languages. Use of state-of-the-art simulators and HDLs. Students may not receive credit for both ELEG 4293 and ELEG 5993. Prerequisite: ELEG 3223.

ELEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

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)

See listing in the Department of Curriculum and Instruction, page 89.

ENGINEERING, COLLEGE OF (ENGR)

<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. 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 that includes 50 percent graduate-level credit in the field of study.
2. 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. Courses are offered in five 8-week terms each year. 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.

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.

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. Other students are required to have credit for the basic mathematics (through differential equations), chemistry, and physics courses required for undergraduate degrees in engineering.

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 6 semester hours of project research can be used to satisfy the required 30 semester hours of credit by writing a project paper 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 confer-

ence with the major professor and with advice from the candidate's graduate committee.

General Requirements for the Doctor of Philosophy Degree in Engineering

The program of study leading to the degree of Doctor of Philosophy in Engineering will vary, depending upon the major field of study and the objective of the prospective candidate. Program requirements balance credit hours for required coursework, research, and dissertation preparation.

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. A minimum of 72 semester hours of graduate-level credit beyond the bachelor's degree.
2. A minimum of 42 semester hours of graduate-level credit beyond the master's degree.

Departments may set higher grade standards and additional requirements. (See department requirements.) Students from non-engineering backgrounds typically will be required to take selected fundamental engineering courses.

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
General Engineering
Industrial Engineering
Mechanical 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)

GNEG5103 Globalization and Innovation (Irregular) Integration of engineering in the globalized business environment. Innovation and integration models. Global survival skills. International organizational value-chain. Conducting business with emerging nations. Case studies; field trips; guest lectures. Experiential learning design component. Taken by students participating in departmental approved study abroad programs. May not earn credit for GNEG 3103 or 4103.

GNEG550V Master's Research Project (Irregular) (1-3) Required course for MSE students who wish to complete a Master's research project as part of their degree program. Prerequisite: Instructor permission.

GNEG5801 Internship (Sp, Su, Fa) Supervised experience in industry where students can learn to apply classroom skills to problems in the real-world environment. Prerequisite: Instructor permission. May be repeated for up to 3 hours of degree credit.

GNEG5811 Cooperative Education (Sp, Su, Fa) Supervised experience in industry where students can learn to apply classroom skills to problems in the real world environment. Prerequisite: Instructor permission.

GNEG590V Special Topics (Irregular) (1-4) Consideration of current engineering topics not covered in other courses. Prerequisite: Instructor's consent. May be repeated for up to 4 hours of degree credit.

ENGLISH (ENGL)

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- Brown Chair in Literacy Professor Jolliffe
- Professors Adams, Booker, Burris, Candido, Cochran, DuVal, Giles, Hays, Heffernan, Montgomery, Quinn, Roberts, Stephens
- Associate Professors Brock, Dominguez Barrajas, Gilchrist, Hays, Kahf, Marren, McCombs, Slattery
- Assistant Professors Fagan, Hinrichsen, Kayser, Sexton, Smith, Witherbee
- Visiting Assistant Professors Dempsey, Kayser, Viswanathan
- Adjunct Assistant Professor McCray

Degrees Conferred:

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

M.F.A. in Creative Writing (CRWR) (See Creative Writing)

Areas of Study: Master of Arts – history and criticism of literature in English; rhetoric, composition, and literacy; Master of Fine Arts – drama, fiction, poetry, translation; Doctor of Philosophy – Medieval; Renaissance to 1660; Restoration and eighteenth century; nineteenth century; twentieth century; American literature to 1900; twentieth-century American literature; linguistics; literary criticism and theory; southern literature and culture; world literature and culture in English; American multiculturalism; gender studies; film and media studies; popular culture and popular genres; and literary history. Secondary emphasis in rhetoric and composition.

Prerequisites to Degree Program: Detailed instructions for the application process are on the English Department website (above). Each applicant must submit a separate application to the Graduate School and either the Director of Graduate Studies (for the M.A. and Ph.D. programs) or the Director of Creative Writing (for the M.F.A. 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.

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 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. Candidates for the concentration in Rhetoric, Composition, and Literacy must present 33 hours of course work or 27 hours of course work and a thesis. Candidates for this concentration must meet all of the requirements listed in 1, 1a., 1b., 1c., and 1d. above. In addition, candidates for this concentration must take: a) ENGL 5003 Composition Pedagogy; b) at least one three-hour course in the history and/or theory of rhetoric; and c) at least one three-hour course in literacy, the English language and/or linguistics.
 3. 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.)
 4. 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.
 5. 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 Di-

rector 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.
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.

ENGL4133 Writing Nature (Sp) Study of writings about nature, both scientific and literary. Examination of the basis of each author's relationship with (and definition of) the natural world while examining the literary/aesthetic aspects of that experience. Prerequisite: ENGL 1023. May be repeated for up to 9 hours of degree credit.

ENGL4133H Honors Writing Nature (Sp) Study of writings about nature, both scientific and literary. Examination of the basis of each author's relationship with (and definition of) the natural world while examining the literary/aesthetic aspects of that experience. Prerequisite: ENGL 1023. May be repeated for up to 9 hours of degree credit.

ENGL4303 Introduction to Shakespeare (Sp, Su, Fa) Extensive reading in Shakespeare's comedies, histories, tragedies, and nondramatic poetry.

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 for up to 9 hours of degree credit.

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 for up to 9 hours of degree credit.

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 for up to 3 hours of degree credit.

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 WLLC 504V) May be repeated for up to 15 hours of degree credit.

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 credit.

ENGL5173 Studies in Medieval Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

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 for up to 12 hours of degree credit.

ENGL5233 Craft of Translation: I (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.

ENGL5243 Special Topics (Irregular) Designed to cover subject matter not offered in other courses. May be repeated for credit.

ENGL5263 Craft of Fiction: I (Irregular) Such aspects of the genre as scene, transition, character, and conflict. Discussion is limited to the novel.

ENGL5273 Craft 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 Craft 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 Craft 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 for up to 12 hours of degree credit.

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 for up to 12 hours of degree credit.

ENGL5463 Descriptive Linguistics (Fa) A scientific study of language with primary emphasis on modern linguistic theory and analysis. Topics include phonology, morphology, syntax, semantics, language acquisition, and historical development of world languages. (Same as ANTH 5473, COMM 5463, WLLC 5463)

ENGL5603 World Literature and Culture in English (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

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) (1-3) 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, the film musical. (Same as COMM 569V) May be repeated for up to 6 hours of degree credit.

ENGL5703 Studies in American Literature and Culture Before 1900 (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5723 Studies in Literature and Culture of the American South (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5803 Studies in Twentieth-Century American Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5923 Film and Media Studies (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5933 Studies in Popular Culture and Popular Genres (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5943 Studies in Criticism and Literary Theory (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5953 Studies in Literary History (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL5973 Studies in Rhetoric and Composition (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6113 Seminar in Medieval Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6203 Seminar in Renaissance Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6243 Seminar in Special Topics (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6443 Seminar in Nineteenth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6513 Seminar in Twentieth-Century British Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6613 Seminar in World Literature and Culture in English (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

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 for up to 12 hours of degree credit.

ENGL6723 Seminar in American Literature and Culture Before 1900 (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6733 Seminar in Literature and Culture of the American South (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6803 Seminar in Twentieth-Century American Literature and Culture (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6933 Seminar in Popular Culture and Popular Genres (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6943 Seminar in Literary Theory (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6953 Seminar in Literary History (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

ENGL6973 Seminar in Rhetoric and Composition (Irregular) Subject matter changes depending on student interest and faculty expertise. May be repeated for up to 12 hours of degree credit.

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)

Robert N. Wiedenmann
 Department Head
 319 Agriculture Building
 479-575-2451
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<http://www.uark.edu/depts/entomolo/>

- University Professor Stephen
- Professors Goggin, Johnson, Kring, Lorenz, McLeod, Steinkraus, Szalanski, Teague, Wiedenmann
- Associate Professors Hopkins, Loftin, Studebaker
- Assistant Professors Dowling, McKay
- Adjunct Professors Crook, Lorence, Yanoviak
- Curator Barnes

Degrees Conferred:
 M.S., Ph.D. (ENTO)

Primary Areas of Faculty Research: Pest management, insect pathology, insect-plant interactions, arthropod-animal interactions, biological control, molecular biology, taxonomy, systematics, physiology, and insect ecology.

Prerequisites to Degree Program: Applicants for graduate degrees must meet all requirements for admission to the Graduate School. Applicants without a master's degree will be accepted into the departmental program based on grade-point average (GPA), letters of recommendation, résumé and an adviser 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 without a master's degree will be evaluated for undergraduate research experience and strong academic credentials. 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 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. Specific requirements follow:

General Course Requirements: The degree program and coursework for each candidate will be arranged on an individual basis. M.S. students must register for a minimum of 30 hours of graduate credit including 6 thesis hours.

Core Course Requirements: The student must take or have taken courses equivalent to ENTO 3013 Introduction to Entomology, ENTO 4024 Insect Diversity and Taxonomy, ENTO 4053 Insect Ecology, ENTO 4123 Principles of Insect Pest Management, ENTO 5013 Morphology of Insects, and ENTO 6113 Insect Physiology. A course in statistics for graduate credit is also required.

Seminar Requirements: Two semester hours of seminar are required. Seminar hours may be taken in Entomology (ENTO 6071) or, with Department Head approval, as a formal for-credit seminar offered in another department within the university. In addition, each student is required to present a seminar on his/her thesis research plans during the first year of the degree program and an exit seminar on the thesis research prior to leaving the program.

Residence Requirements: A minimum of 30 weeks in residence is required for the M.S. degree.

Grade Point Average Requirement: A minimum 3.00 GPA must be maintained. If the cumulative GPA falls below 3.00, or research or general academic progress is unsatisfactory, the student's performance will be reevaluated by the Advisory Committee and a recommendation made on continued status as a graduate student. For details about this process, please see the Graduate Student Handbook on the departmental Web site.

Comprehensive Examination: A comprehensive oral examination covering coursework and defense of the thesis research is required. The examination is generally taken during the student's final semester.

Requirements for the Doctor of Philosophy Degree: A major requirement for the Ph.D. degree is a dissertation based on original research in an area of entomology. 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. Specific requirements follow:

General Course Requirements: The degree program and coursework for each candidate will be arranged on an individual basis by the major professor, the Advisory Committee, and the student. A minimum of 30 hours of graduate coursework, excluding seminar, must be completed. Students progressing directly from the B.S. to the Ph.D. degree may require additional coursework as defined by the Advisory Committee.

Core Course Requirements: The student must take or have taken courses equivalent to ENTO 3013 Introduction to Entomology, ENTO 4024 Insect Diversity and Taxonomy, ENTO 4053 Insect Ecology, ENTO 4123 Principles of Insect Pest Management, ENTO 5013 Morphology of Insects, and ENTO 6113 Insect Physiology. A course in statistics for graduate credit is also required. Students with credit for core courses will meet requirements with relevant courses in biology, chemistry, plant or animal science, or as approved by the Advisory Committee.

Seminar Requirements: Four semester hours of seminar are required. Seminar hours may be taken in entomology (ENTO 6071) or as a formal for-credit seminar offered in another department within the University. At least three of the seminar hours must be in entomology unless approved in advance by the Department Head. In addition, each student is required to present a seminar on his/her dissertation research plans during the first year of the degree program and an exit seminar on the dissertation research.

Graduate Hour Requirements: A minimum of 30 hours of graduate coursework, excluding seminar, is required.

Residence Requirement: Students must complete two consecutive semesters of full-time graduate study to achieve residency.

Grade Point Average Requirement: A minimum 3.25 GPA must be maintained. If the cumulative GPA falls below 3.25, or research or general academic progress is unsatisfactory, the student's performance will be reevaluated by

the Advisory Committee and a recommendation made on continued status as a graduate student. For details about this process, please see the Graduate Student Handbook on the departmental Web site.

Candidacy Examination: Before completion of the fourth semester, the student will take written candidacy examinations as specified by the Advisory Committee and a comprehensive oral examination covering entomology and supporting areas. These examinations must be successfully completed at least one academic year before the degree is conferred.

Comprehensive Examination: A comprehensive oral examination covering coursework and defense of the dissertation research is required. The examination is generally taken during the student's final semester.

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 (Same as BIOL 4013)

ENTO4024 Insect Diversity and Taxonomy (Even years, Fa) Principles and practices of insect classification and identification with emphasis on adult insects. Corequisite: Lab component. Prerequisite: ENTO 3013. (Same as BIOL 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. (Same as BIOL 4053)

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 for credit.

ENTO4123 Insect Pest Management (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, physiological 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, Sp) Biology and ecology of major arthropod pests as model applied management systems. Activities include independent study, literature review and group discussions. Knowledge of general entomology and pest management is required. Self-learning modules are available. Lecture 2 hours/week and direct self-study 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 up to 4 hours of degree credit.

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 credit.

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. (Same as BIOL 5133)

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 up to 6 hours of degree credit.

ENTO6113 Insect Physiology and Molecular Biology (Even years, Sp) Overview of insect physiology and modern molecular techniques to study physiological processes. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. (Same as BIOL 6113)

ENTO6213 Insect Toxicology (Odd years, Fa) 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) (1-18) Prerequisite: graduate standing.

ENVIRONMENTAL DYNAMICS (ENDY)

Stephen Boss
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Agricultural Economics and Agribusiness Faculty:

- Professor Popp (M.)
- Associate Professor Popp (J.)
- Assistant Professor Nalley

Animal Sciences Faculty:

- Professor Coffey

Anthropology Faculty:

- Distinguished Professor Ungar
- Professors Kay, Kvamme, Plavcan, Rose, Sabo, Schneider, Swedenburg
- Research Professor Mainfort
- Associate Professors Casana, Nolan
- Research Associate Professor Green
- Adjunct Assistant Professor Lockhart

Archeological Survey, Cooperating Faculty:

- Professor House
- Associate Professors Early, Jeter, Mitchem, Morrow, Payne, Stewart-Abernathy
- Assistant Professors Blakney-Bailey, Brandon, Lockhart, Trubitt

Biological Engineering Faculty:

- Professor Matlock

Biological Sciences, Cooperating Faculty:

- University Professors Gentry, James, Smith
- Professors Beaupre, Spiegel
- Research Professors Magoulick, Stephenson
- Associate Professors Brown, Sagers
- Assistant Professor Huxel
- Adjunct Associate Professor Zeigler

Chemical Engineering Faculty:

- Professor Thoma

Crop, Soil, and Environmental Sciences Cooperating Faculty:

- Professors Brye, Miller, West
- Assistant Professor Scott (J.)

Curriculum and Instruction Faculty:

- Professor McComas

Environmental Sciences Cooperating Faculty:

- Associate Professor Savin

Geosciences Faculty:

- Distinguished Professor Stahle
- University Professor Limp
- Professors Boss, Brahana, Davis, Dixon, Guccione, Hehr, Paradise, Zachry
- Associate Professors Cothren, Davidson, Graff, Teng, Tullis
- Research Associate Professor Hays
- Assistant Professors Teng, Hausmann-Suarez, Weeks
- Adjunct Assistant Professors Green (W.), Hubney, Mock, Paillet

History, Cooperating Faculty:

- Distinguished Professor West
- Professors Gordon, Whyne

Horticulture

- Professor Rom

Landscape Architecture, Cooperating Faculty:

- Professor Luoni
- Associate Professors Boyer, Messadi

Management Faculty:

- Professor Johnson

Mathematical Sciences

- Associate Professors Arnold, Petris

Political Science Faculty:

- Associate Professors Arnold, Petris

Political Science Faculty:

- Professors Gaber, Reid
- Assistant Professor Stewart

Psychology Faculty:

- Professor Schroeder

Rural Sociology Faculty:

- Professor Farmer

Sociology Faculty:

- Professor Fitzpatrick, Schwab

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. The program's prime focus is human-environmental interactions within recent Earth history. It stresses interdisciplinary analyses of geophysical, biological, geochemical, and sociocultural interactions related to environmental change. An overarching objective of the ENDY program is to aid development of strategies for sustainable societies based on results of scientific research and respect for human culture. Associated research institutes and laboratories include 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, the Tree-Ring Laboratory, and the Water Quality Laboratory. Faculty from 22 additional departments, across six 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, geoinformatics and geospatial applications); anthropology; soil sciences; sustainability issues; ecology, ecological change, environmental pollution and land use change; and impacts of natural hazards. In addition, many research activities involve strong components of social sciences, economics and sustainable development. 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 and strong scores on all components of the Graduate Record Examination (GRE). 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 of Purpose outlining the applicant's plans for the ENDY degree program that includes relevance of previous academic or work experience, current research interests or em-

ployment that bear on doctoral research, 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 both environmental and human components into their Ph.D. coursework and dissertation research. 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 Quaternary Environments or ENDY/ANTH 6033 Society and Environment). In addition, 18 hours of dissertation research are required.

Environmental Dynamics (ENDY)

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 instructor permission. (Same as ANTH 4653, GEOS 4653)

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, GEOS 5053)

ENDY5063 Climate Through Time (Irregular) 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. (Same as BIOL 5063, GEOS 5063)

ENDY5113 Global Change (Sp) 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)

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 (Fa) 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 up to 6 hours of degree credit.

ENDY602V Current Topics Seminar (Irregular) (1-2) Various aspects of the environment will be explored through topic specific seminars. Subject matter will change each semester addressing current environmental issues and research. Seminars will be one or two hours credit. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

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 palaeo-environmental studies, readings and discussion will explore the co-production of social and environmental systems over time. (Same as ANTH 6033)

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 up to 6 hours of degree credit.

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 up to 6 hours of degree credit.

ENDY700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Graduate standing. May be repeated for up to 18 hours of degree credit.

ENVIRONMENTAL ENGINEERING (ENEG)

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- Professors Clausen (CHEG), Cross (CHEG), Penney (CHEG), Selvam (CVEG), Thoma (CHEG), Young (CVEG)
- Associate Professors Costello (BENG), Chaubey (BENG), Edwards (CVEG), Matlock (BENG), Nutter (MEEG), Soerens (CVEG)
- Assistant Professors Bajwa (BENG), Fairey (CVEG)
- 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	15
Acceptable to undergraduate program	
English composition	6
ENGL 1013 and 1023	
Mathematics and Basic Science Recommended Courses	
Calculus & differential equations	15
MATH 2554, MATH 2564, MATH 2574, & MATH 2584	
Statistics and probability	3
INEG 2313 or STAT 3013	
General Chemistry	4
CHEM 1123 & 1121L	
University Physics (calculus based)	4
PHYS 2054	
Microbiology	4
BIOL 2013 & BIOL 2011L	
Organic Chemistry	4
CHEM 3504 or CHEM 3603 and CHEM 3601L	
Earth Science	2
GEOL 3002 or CSES 2203	
Basic Engineering Topics Recommended Courses	
Statics	3
MEEG 2003	
Dynamics	3
MEEG 2013	
Fluid Mechanics	3
CHEG 2133 or MEEG 3503	
Engineering Economics	2
CVEG 3022 or INEG 2413	

II. Environmental Engineering Breadth Requirements (18 hours)

Required Topics Recommended Courses	
Environmental Engineering	3
CVEG 3243	
Reactor Design	3
CHEG 3333	
Thermodynamics	3
CHEG 3143 or MEEG 2403	
Applied Hydraulics	3
CVEG 3213, CHEG 3153, or MEEG 4483	
Elective Topics (6 hours) Recommended Courses	
Chemical Process Safety	3
CHEG 4813	
Hydrology	3
CVEG 3223	
Environmental Engineering Design	3
CVEG 4243	
Occupational Health and Safety	3
INEG 4223	
Principles of Epidemiology	3
CHLP 5613	
Environmental Health	3
CHLP 6553	

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)

Required Courses: CVEG 5213; CVEG 5214; CVEG 5233

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 4813 Chemical Process Safety
 CHEG 5513 Biochemical Engineering Fundamentals
 CVEG 4243 Environmental Engineering Design
 CVEG 4203 Environmental Regulations and Permits
 CVEG 5233 Groundwater Hydrology
 CVEG 5233 Microbiology for Environmental Engineers
 CVEG 5213 Water Treatment & Distribution System Design
 CVEG 5214 Advanced Wastewater Process Design and Analysis
 MEEG 4453 Industrial Waste and Energy Management
 MEEG 4473 Indoor Environmental Control
 MEEG 4483 Thermal Systems Analysis and Design

Natural and Water Resources Specialty Area:

BENG 4113 Risk Analysis for Biological Systems
 BENG 4903 Watershed Eco-Hydrology
 CVEG 4203 Environmental Regulations and Permits
 CVEG 5243 Groundwater Hydrology
 CVEG 5233 Microbiology for Environmental Engineers
 CVEG 5213 Water Treatment & Distribution System Design
 CVEG 5214 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)

EUST470V Special Topics (Irregular) (1-6) An examination of pertinent issues in Europe. May be repeated for credit.

FINANCE (FINN)

See Graduate School of Business, page 188.

FOOD SCIENCE (FDSC)

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- University Professors Hettiarachchy, Siebenmorgen
- Professors Buescher, Crandall, Howard, Meullenet, Proctor, Ricke, Seideman, Wang
- Assistant Professors Baum, Lee, Morawicki, Seo
- Adjunct Faculty Apple, Brady, Chalova-Zhekova, Devareddy, King, Li, Marcy, Owens-Hanning, Pohlman, Prior

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; food enzymology; functional foods; nutraceuticals; food safety; sensory analysis, human nutrition and chronic diseases.

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)/92 (Internet), 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 (146, new GRE test) for the verbal, 500 (144, new GRE test) 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 M.S. 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)/92 (Internet), 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 (153, new GRE test) for the verbal, 600 (148, new GRE test) 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 Ph.D. 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).

FDSC4121L Food Microbiology Lab (Sp) A hands-on laboratory course designed to teach students microbiological techniques and certain enumeration and plating techniques of specific food spoilage and pathogenic bacteria. Pre- or Corequisite: FDSC 4123.

FDSC4123 Food Microbiology (Sp) The study of food microbiology including classification/taxonomy, contamination, preservation and spoilage of different kinds of foods, pathogenic microorganisms, food poisoning, sanitation, control and inspection and beneficial uses of microorganisms.

Prerequisite: BIOL 2013 and 2011L or BIOL 2533. (Same as BIOL 4123)

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.

FDSC4304 Food Chemistry (Odd years, 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 (Sp, 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: COMM 1313 and BIOL 2013 and BIOL 2011L, 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.

FDSC4823 Principles of Food Microbiology (Irregular) This web-based course is a study of the fundamentals of food microbiology to include its history, classifications, spores and their importance, and the most common and serious pathogenic food microorganisms. Fermentation, spoilage microorganisms and control methodology are also discussed.

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.

FDSC5223 Food Biosecurity (Irregular) This course is the study of the security of agricultural products and the protection of our food supply from intentional and accidental, domestic and international contamination. Prerequisite: Graduate standing.

FDSC5503 Safety and Sanitation for the Food Industry (Irregular) This web-based course will provide an appreciation of the need for sanitation in food processing and increase the students' knowledge of sanitary techniques. Topics will include contamination sources, plant and equipment design, cleaners and sanitizers, HACCP, and food biosecurity. Also covered will be considerations in selecting, establishing and maintaining a sanitation program. Prerequisite: General Microbiology or Food Microbiology; General Chemistry.

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 credit.

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.

FDSC6143 Advanced Food Processing and Packaging and their Environmental Impact (Sp) The course is directed to graduate students in food science and related fields. Students will learn advanced food processing technologies and packaging as well as the environmental issues associated to food production, processing, and distribution. Prerequisite: FDSC 3103 or equivalent, or food processing/engineering background with knowledge of basic food processing operations.

FDSC6323 Nutraceuticals and Functional Foods (Even years, Sp) Course will include past, present and future of nutraceuticals and functional foods, chemistry, mechanism, novel technologies, nutrigenomics, processing, healthy lifestyle, regulation, safety, marketing, international aspects, and industry project. Prerequisite: CHEM 2613 (or CHEM 3603 and CHEM 3813 and FDSC 4304 or instructor consent).

FDSC6333 Food Protein Chemistry and Functionality (Odd years, Sp) This course is a study in advanced food protein chemistry, including molecular structures, characterization, physicochemical 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) (1-18) 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.

FRENCH

See World Languages, Literatures, and Cultures, page 164.

GENERAL AGRICULTURE (GNAG)

See Agricultural, Food, and Life Sciences, page 56.

GEOSCIENCES, DEPARTMENT OF (GEOS)

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- Distinguished Professor Stahle
- University Professor Limp
- Professors Boss, Brahana, Davis, Dixon, Guccione, Hehr (J.), Paradise, Zachry
- Associate Professors Cothren, Davidson, Graff, Teng, Tullis
- Assistant Professor Covington, Dumond, Hausmann, Shi, Suarez, Weeks, Xie
- Adjunct Professors Jasma, Mock, Paillet
- Adjunct Associate Professor Hays
- Adjunct Assistant Professors Bragg, Brown, Fye, Green, Hehr (L.), Hubney, Melton, Moyer

Degrees Conferred:

M.A. in Geography (GEOG)

M.S. in Geology (GEOL)

Ph.D. in Geosciences (GEOS)

Geography (GEOG) (M.A.)

Areas of Study: 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 two 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) (M.S.)

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 February 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 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.

Geosciences (GEOS) (Ph.D.)

Primary Areas of Faculty Research: 1) basin evolution and analysis (including multiple aspects of petroleum geology that incorporate sedimentation, structural geology, stratigraphy and geophysics), 2) crustal and mantle composition and tectonic evolution, 3) neotectonics and dynamic geomorphology, 4) geoinformatics (including GIS, remote sensing, GPS geodesy, and geospatial analysis), 5) groundwater dynamics, karst hydrology and limnology, and 6) paleoclimatology.

The Department of Geosciences focuses on research and education dealing with the nature, genesis, and history of the Earth and the global environment, the evolution of landscapes and biota at the Earth's surface, and the advance of geospatial technologies. The Doctor of Philosophy degree is designed for students who are committed to scholarship in the geosciences and who wish to prepare for professional employment within the academic community, industry, or government. Geosciences research requires rigorous observation, quantitative analysis, and modeling in order to yield scientific results that are acceptable for publication in first-rate, internationally-ranked journals. Given the interdisciplinary nature of Geosciences, the Department of Geosciences encourages research including elements of space and planetary sciences, biological sciences, environmental sciences, physics and chemistry to address relevant problems at the boundaries of geoscience and other disciplines.

Applicants for the doctoral program must have completed the baccalaureate degree with a major in geosciences or an allied discipline. Students with academic preparation at the undergraduate or masters level in other disciplines of physical science, engineering, and mathematics are also encouraged to apply. All applicants must submit their scores on the Graduate Record Examination directly to the University of Arkansas Graduate School, provide three letters of recommendation from individuals qualified to assess the applicant's academic potential, a personal curriculum vita, and a statement of academic and research interests. Contact the department for application materials.

Qualified students with a bachelor's degree or a master's degree may be accepted into the Ph.D. program. Academic requirements for admission to the program are listed in the table below. In addition, prospective applicants are encouraged to contact Department of Geosciences faculty with similar research interests to initiate dialogue regarding availability for mentoring, potential research topics, and research funding opportunities.

Requirements for Admission to the Doctor of Philosophy degree in Geosciences:

- Minimum Undergraduate GPA: 2.85 on a 4.0 system
- Minimum Graduate GPA: 3.20 on a 4.0 system
- Minimum GRE Verbal: 153
- Minimum GRE Quantitative: 144
- Minimum GRE combined Verbal and Quantitative: 297
- Minimum GRE writing: 4
- International students only: a minimum score of 6.5 on the International English Language Testing System (IELTS), 79 on the Internet-based Test of English as a Foreign Language (TOEFL), or a 58 on the Pearson Test of English - Academic (PTE-A), taken within the preceding two years
- M.S./M.A. requirements: 24 units graduate courses, 6 hours thesis
- Recommendations: Three (3) letters of recommendation from individuals qualified to assess the applicant's academic potential
- Ph.D. course requirements: 24 units graduate courses; 18 hours dissertation; completed original dissertation research.
- No course with a grade of less than a C (graduate or undergraduate) will be accepted as fulfilling prerequisites.
- Acceptance by an adviser
- Other: Current Curriculum Vita; Statement of academic and research interests

Course Requirements for the Doctor of Philosophy Degree:

- 24 course hours beyond the U of A MS/MA degree or equivalent.
- GEOS 5023 Technical and Proposal Writing for the Geosciences
- It is strongly recommended that two courses be taken outside of the Department that are supplementary to the students interests and dissertation topic. These may be 3000-level undergraduate courses, if approved by the Advisory Committee and the Graduate School.
- No more than 3 hours of Special Problems or Independent Research
- Dissertation - 18 hours to be taken after admission to candidacy.

Any waivers to these requirements must be appealed to the Advisory or Dissertation committee and the departmental Graduate Advisor.

The student must maintain a 3.0 GPA in course work taken for the PhD degree.

The Doctor of Philosophy degree is primarily a research degree, but communication of that research is critical for professional development and required for most professional pursuits. To promote development of the communication skills, each student is required to teach labs and/or a course for at

least one semester and to present scientific results at one or more national or international professional meetings.

 Geography (GEOG)

- GEOG4023 Fallen Temples & Forgotten Gods: Cultural Geography of Ancient Religions (Fa)** A global survey of ancient religious life.
- GEOG4033 Geography of the Middle East (Irregular)** Physical and cultural landscapes, natural and cultural resources, art and architecture, land use, 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.
- GEOG4053 Kokopelli and the Rainbow Serpent: Native American Rock-Art (Sp)** An introduction to Native American Cultural Geography through the study of rock-art, often referred to as "petroglyphs" and "pictographs". This course focuses on the conservation, documentation, analysis, and interpretation of ancient imagery carved and painted by Native Americans on cliffs, boulders, and cave walls.
- 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.
- 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.
- GEOG4383 Hazard & Disaster Assessment, Mitigation, Risk & Policy (Sp)** Comprehensive introduction to interdisciplinary approaches to natural and environmental hazards and risk. Hazards and disaster assessment, mitigation, and policy are the focus of the class. Prerequisite: Junior standing or above. May be repeated for up to 3 hours of degree credit.
- GEOG4783 Geography of Europe (Irregular)** Geographic regions of the area with emphasis on their present development. Prerequisite: Junior standing.
- GEOG5003 Seminar in Geography (Irregular)** Selected topics, the nature of which varies with the need. Prerequisite: Graduate standing. May be repeated for up to 3 hours of degree credit.
- 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 up to 2 hours of degree credit.
- 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 up to 6 hours of degree credit.
- 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. (Same as ENDY 5113)
- GEOG520V Special Problems in Human Geography (Sp, Su, Fa) (1-6)** Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.
- 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 2043 or MATH 2554, and GEOL 3513.
- 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.
- GEOL4063 Principles of Geochemistry (Fa)** Introduction to fundamental principles of geochemistry from historic development to modern concepts. Corequisite: Lab component. Prerequisite: CHEM 1121 and CHEM 1123.
- 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 (Fa)** 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 up to 3 hours of degree credit.
- 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 up to 4 hours of degree credit.
- 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/PHYS 2031L and GEOL 3514/GEOL 3511L.
- GEOL4863 Geological Data Analysis (Sp)** Quantitative methods and techniques for analysis and interpretation of geological data. Prerequisite: MATH 2564, GEOL 3514.
- GEOL4924 Earth System History (Sp)** Physical and biological events that form the history of

the earth from its formation to the beginning of the historical era. Graduate enrollment only with departmental permission. Prerequisite: GEOL 3514.

- GEOL5001 Graduate Seminar (Irregular)** Informal discussions of research as reported in geological literature. All graduate students are expected to attend.
- 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.
- 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. (Same as ENDY 5153)
- 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 (Even years, Fa)** 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.
- GEOL5443 The Solid Earth (Irregular)** Modern views for the origin of the solid Earth and its structure, composition, and evolution through geologic time. Topics will include examination of relevant geophysical and geochemical constraints used to develop global models for the Earth. Prerequisite: GEOL3313, MATH2564, CHEM1123, PHYS2074 or permission of the instructor.
- 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.
- GEOL5553 Volcanology (Irregular)** A broad introduction to volcanic processes and their associated hazards. Emphasis will be placed on applying basic physical and chemical principles to understanding volcanic systems. Prerequisite: GEOL 2313.
- GEOL560V Graduate Special Problems (Sp, Su, Fa) (2-6)** Library, laboratory, or field research in different phases of geology. May be repeated for up to 4 hours of degree credit.
- GEOL600V Master's Thesis (Sp, Su, Fa) (1-6)** Prerequisite: Graduate standing.

 Geosciences (GEOS)

- GEOS4333 Pollution of Lakes and Rivers (Sp)** Explores human impact on aquatic ecosystems. Covers critical issues such as acidification, eutrophication, land-use changes, pollution by metals and other contaminants, climatic change, and bio-diversity losses. Examines biological indicators and geochemical markers archived in lake sediments to identify key environmental stressors of aquatic ecosystems. Prerequisite: One upper-division science course.
- GEOS4333H Honors Pollution of Lakes and Rivers (Sp)** Explores human impact on aquatic ecosystems. Covers critical issues such as acidification, eutrophication, land-use changes, pollution by metals and other contaminants, climatic change, and bio-diversity losses. Examines biological indicators and geochemical markers archived in lake sediments to identify key environmental stressors of aquatic ecosystems. Prerequisite: One upper-division science course.
- GEOS440V 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 up to 6 hours of degree credit.
- GEOS4413 Principles of Remote Sensing (Fa)** Fundamental concepts of remote sensing of the environment. Optical, infrared, microwave, LIDAR, and in situ sensor systems are introduced. Remote sensing of vegetation, water, urban landscapes, soils, minerals, and geomorphology is discussed. The course includes laboratory exercises in geomatics software and both remote and in situ sensor system field trips.
- GEOS4523 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 Illustrator software to build a map portfolio. Field trips may be required. Prerequisite: GEOS 3023.
- GEOS4553 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 algebra, and other methods. Prerequisite: GEOS 3543 or ANTH 3543. (Same as ANTH 4553)
- 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.
- GEOS4583 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 mainstream GIS software and relational data bases. Prerequisite: GEOS 3023 or GEOS 3543. (Same as ANTH 4563)
- GEOS4593 Introduction to Global Positioning Systems (Fa)** Fundamentals of navigation, mapping, and high-precision positioning using the Navstar Global Positioning System. Topics include datum definition and transformation, map projections, autonomous and differential positioning using both code and carrier processing, and analysis of errors. Prerequisite: GEOS 3543. (Same as ANTH 4593)
- GEOS4653 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: GEOS 4553 or ANTH 4553. (Same as ANTH 4653, ENDY 5043)
- 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.
- GEOS4863 Quantitative Techniques in Geosciences (Sp)** 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)

GEOS5023 Technical and Proposal Writing for the Geosciences (Sp) Preparation of technical reports, research proposals, and manuscripts for publication in the area of geosciences.

GEOS5033 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 generation, error mapping, and cartographic production. Prerequisite: (ANTH 4563 or GEOS 4583) or equivalent. (Same as ANTH 5043)

GEOS5053 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, ENDY 5053)

GEOS5063 Climate Through Time (Irregular) 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. (Same as BIOL 5063, ENDY 5063)

GEOS5423 Remote Sensing of Natural Resources (Even years, Sp) Introductory digital image processing of remotely sensed data. Topics include data collection, laboratory design, scientific visualization, radiometric and geometric correction, enhancement, pattern recognition, artificial intelligence, and change detection in natural resource remote sensing. GIS-based exercises and a course project are included. Prerequisite: GEOS 4413 is recommended.

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 up to 3 hours of degree credit.

GERMAN

See World Languages, Literatures, and Cultures, page 164.

HEALTH, HUMAN PERFORMANCE AND RECREATION (HHPR), DEPARTMENT OF

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- University Professor DiBrezza
- Professors Fort, Gorman, Hunt, Jones, Moiseichik
- Adjunct Professors Gagliardi, Guyton
- Associate Professors Hammig, Henry, Langsner, Lirgg
- Clinical Associate Professor Kern
- Assistant Professors Benton, Dittmore, Ganoi, Gray, Jozkowski, Washington
- Clinical Assistant Professors Bonacci, Calleja, Smith-Nix, Sullivan
- Adjunct Assistant Professor Blanch
- Instructors Edmonston, Forbes, Mayes

Degrees Conferred:

M.AT. in Athletic Training (ATTR)
M.Ed. in Physical Education (PHED)
M.Ed., Ed.D. in Recreation and Sport Management (RESM)
M.S., Ph.D. in Community Health Promotion (CHLP)
M.S., Ph.D. in Kinesiology (KINS)

Primary Areas of Faculty Research: Pedagogical Research; Human Performances; Women's Health; Diabetes; Special Populations; Accident and

Injury prevention; Epidemiology; Aging; Legal Issues of Sport and Recreation; Interpretive Services in National Parks; and Community Development Using Recreation.

ATHLETIC TRAINING (ATTR) (M.AT.)

The Master of Athletic Training degree program prepares individuals for employment as athletic trainers for high school, college, professional sports organizations and private clinics.

The Master of Athletic Training degree requires 51-54 credit hours of course work to graduate.

Prerequisites to Athletic Training Degree Program: For acceptance to the Master of Athletic

Training degree program, 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 Athletic Training Degree:

Candidates for the Master of Athletic Training degree must complete 48 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 the required athletic training competencies and proficiencies as mandated by the accrediting body.

The Master of Athletic Training:

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 BOC examination. This is a full-time graduate program that begins in July each year, and requires considerable clinical experience as part of the requirements for graduation. This is a competitive master's program that requires admission to the HHRP department and the Graduate Athletic Training Education Program.

Deficiency/Prerequisite Courses for Admission to the Master of Athletic

Training: Students desiring admission to the athletic training education program must complete the following deficiency/prerequisite courses prior to admission: HESC 1213 Nutrition in Health, CHLP 1103 Personal Health and Safety, 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 BOC 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 the Athletic Training Education Program Application (see athletic training Web site; 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 Athletic Training degree and BOC 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 for Athletic Training Education (CAATE)). Applicants who may not meet these technical standards are encouraged to contact the Program Director of Athletic Training Education, 303 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 BOC 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://kins.uark.edu/atep> 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 two athletic training faculty and the HHPR graduate coordinator, 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 from the Program Director.

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).

Athletic Training: (51-54 hours)

Required Research Component (6 hours)

ESRM 5393 Statistics in Education and Health Professions, or

ESRM 6403 Educational Statistics and Data Processing

HHPR 5353 Research in HHPR

HHPR required courses (42 hours)

ATTR 5212 Ath Train Clin I-App of Athletic Injury Preventive Devices

ATTR 5222 Ath Train Clin II-Emergency Procedures

ATTR 5232 Ath Train Clin III-Lower Extremity Evaluation

ATTR 5242 Ath Train Clin IV-Evaluation of Upper Extremity

ATTR 5252 Ath Train Clin V

ATTR 5262 Ath Train Clin VI-Rehabilitation Lab

ATTR 5272 Ath Train Clin VII-Athletic Training Seminar

ATTR 5363 Eval Tech of Ath Injury-Upper Extremity

ATTR 5373 Eval Tech of Ath Injury-Lower Extremity

ATTR 5453 Therapeutic Modalities in Athletic Training

ATTR 5463 Therapeutic Exercise and Rehab of Athletic Injuries

ATTR 5473 Administration in Athletic Training

ATTR 5483 Medical Conditions in Athletic Training

KINS 5323 Biomechanics I

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 (master's degree project), or

KINS 600V Master's Thesis

Athletic Training (ATTR)

ATTR5212 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 the clinical program and application of athletic preventive devices will be included as well. Prerequisite: Admission to the graduate program in athletic training.

ATTR5222 Athletic Training Clinical II - Emergency Procedures (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. Prerequisite: ATTR 5212.

ATTR5232 Athletic Training Clinical III - Lower Extremity Evaluation (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 the evaluation skills of gait, lower extremity, and spine/pelvis. Prerequisite: ATTR 5222.

ATTR5242 Athletic Training Clinical IV - Evaluation of 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: ATTR 5232.

ATTR5252 Athletic Training Clinical IV (Su) This course will to monitor students' progression of athletic training competencies and, acquisition of clinical hours under the direct supervision of a athletic training clinical instructor during pre-season conditioning. Prerequisite: ATTR 5232.

ATTR5262 Athletic Training Clinical VI - 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: ATTR 5252.

ATTR5272 Athletic Training Clinical VII - 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: ATTR 5262.

ATTR5363 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.

ATTR5373 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.

ATTR5453 Therapeutic Modalities in Athletic Training (Fa) 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.

ATTR5463 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.

ATTR5473 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.

ATTR5483 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.

ATTR5493 Evidence Base Practice in Athletic Training (Su) In-depth analysis of current literature, research, case studies, and musculoskeletal evaluation and rehabilitation directed toward musculoskeletal injuries of the physically active. Prerequisite: Admission into the Athletic Training Education Program.

COMMUNITY HEALTH PROMOTION (CHLP) (M.S.; Ph.D.)

<http://chlp.uark.edu/2476.htm>

The Community Health Promotion program prepares students in the area of Community Health (M.S.). The Ph.D. program prepares students with the competencies necessary to perform teaching and research duties both in private and public sectors including university settings. The minimum number of credit hours required to complete the master's degree is 33 and 60 hours are required to complete the Ph.D.

Prerequisites to M.S. 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 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).

M.S. Community Health Promotion Degree Program (33 hours)

Required Research Component (6 hours)

ESRM 5393 Statistics in Education & Health Professions, or

ESRM 6403 Educational Statistics and Data Processing

HHPR 5353 Research in HHPR

Required Courses (9 hours)

CHLP 4613 Principles of Epidemiology

CHLP 5533 Theories of Health Behavior

CHLP 5563 Public Health: Practices and Planning

CHLP 5573 Principles of Health Education

Required Internship (3 hours)

CHLP 574V Internship

Required Project or Thesis (3-6 hours)

CHLP 589V Independent Research (master's degree project)

Approved Electives (9-12 hours)

Prerequisites to the Ph.D. Degree Program: The applicant must have completed a master's degree or its equivalent in health 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 community health

promotion; 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. Community Health Promotion 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 49. Further requirements of the Doctor of Philosophy degree in community health promotion include the following:

Departmental Core Requirements

Required Prerequisites: (9 hours)

CHLP 5573 Principles of Health Education

CHLP 5563 Public Health: Practices and Planning

CHLP 4613 Principles of Epidemiology I

Required Courses: (6 hours)

CHLP 6333 Health Behavior Research

CHLP 6803 Health Communication Theory, Research and Practice

Nine hours from the following:

CHLP 6553 Environmental Health

CHLP 6733 Health and the Aging Process

CHLP 6833 Principles of Epidemiology II

CHLP 699V Seminar (3 hours) or HHPR 699V Seminar (3 hours)

Research and Statistical Requirements

Required Prerequisites: (6 hours)

HHPR 5353 Research in HHPR

ESRM 5393 Statistics in Education and Health Professions, or

ESRM 6403 Educational Statistics and Data Processing

(or equivalent)

Required Courses: (6 hours)

ESRM 6413 Experimental Design in Education

ESRM 6423 Multiple Regression Techniques for Education

Additional Courses (9 hours)

Selected from the following with the approval of adviser:

ESRM 6533 Qualitative Research

ESRM 6453 Applied Multivariate Statistics

ESRM 6623 Techniques of Research in Education

ESRM 6653 Measurement and Evaluation

ESRM 699V (3) Seminar

HHPR 699V (3) Seminar

*Other adviser approved 5000- or 6000-level research and/or

statistics courses.

Field of Study (9 hours)

Students, in consultation with their doctoral advisory committee, will identify further course work comprising a field of study in community health promotion, consistent with the goals and objectives of the students and institution. Course work may be selected from several related disciplines or a single discipline.

Community Health Promotion (CHLP)

CHLP410V Global Health: Issues, Concepts and Perspectives (Su) (3-6) Emphasis placed on needs assessment, development, implementation, evaluation, and sustainability of public health initiatives designed to improve the health and well-being of community members at all

levels of the health continuum; topics of focus will include determinants of health, mental health, environmental health, nutrition, maternal and child health, sexual health, injuries and chronic and infectious diseases. Prerequisite: Approval from Study Abroad to participate in the Community Development Service Learning Program.

CHLP4603 Application of Health Behavior Theories in Health Education (Odd years, Sp) 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.

CHLP4613 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 up to 6 hours of degree credit.

CHLP4623 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).

CHLP5353 Health Counseling (Odd years, Fa) 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.

CHLP5533 Models and Theories of Health Behavior (Fa) This course will provide a basic foundation in the social and behavioral sciences relevant to public health. Students will learn the role of social and behavioral determinants in the health of individuals and of populations. Then, students will learn models and theories of health behavior, both generally and specifically. Generally, the student will learn how to identify, analyze, and use theoretical constructs and principles with particular attention to the use of theory in professional public health practice. Specifically, the student will learn the constructs and principles of several theories commonly used in public health behavior research and intervention design. The course will cover the four major individual that focus on intrapersonal factors (i.e., Health Belief Model, Transtheoretical Model, Theory of Reasoned Action/Planned Behavior, and Social Cognitive Theory) as well as several social, organizational, and community theories that are beyond the individual level.

CHLP5543 Contemporary Issues in Human Sexuality (Irregular) In-depth analysis of the social, biological, and behavioral factors associated with the development of one's sexuality.

CHLP5563 Public Health: Practices and Planning (Sp) Acquaints the student with the structure, functions, and current problems in public health and with the role of education in public health. Prevention and control practices and planning will be emphasized.

CHLP5573 Principles of Health Education (Fa) Current trends, basic issues, controversial issues, and fundamental principles of health education.

CHLP5633 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.

CHLP5643 Multicultural Health (Even years, Sp) Through lecture, discussion, simulations, and case studies, students will develop an appreciation for the cultural traditions and practices of different groups. The importance and implications of these traditions on health outcomes and health status will be examined. Particular attention will be paid to the role of the public health educator in mediating the impact of health disparities, including advocacy. Students will develop skills of cultural competence that are essential for public health practitioners today. Prerequisite: Graduate standing or consent.

CHLP574V Internship (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

CHLP589V Independent Research (Sp, Su, Fa) (1-6) Development, implementation, and completion of graduate research project. Prerequisite: M.S. degree in Community Health Promotion and HHPR 5353 and ESRM 5393.

CHLP600V Master's Thesis (Sp, Su, Fa) (1-6)

CHLP605V Independent Study (Sp, Su, Fa) (1-6) Provides students with an opportunity to pursue special study of education problems. May be repeated for up to 6 hours of degree credit.

CHLP6333 Health Behavior Research (Even years, Fa) A review of human behavior and its relationship to health and wellbeing. Focuses on contemporary health behavior research and instrumentation.

CHLP6553 Environmental Health (Odd years, 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.

CHLP6733 Health and the Aging Process (Odd Years, Sp) An overview of the health-related issues facing elderly populations with in-depth study of the biological and behavioral changes associated with aging.

CHLP6803 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.

CHLP6833 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: ESRM 5393 or ESRM 6403.

CHLP699V Seminar (Irregular) (1-6) Discussion of selected topics and review of current literature in community health promotion. Prerequisite: Advanced graduate standing. May be repeated for up to 12 hours of degree credit.

KINESIOLOGY (KINS) (M.S.; Ph.D.)

<http://kins.uark.edu/>

The Kinesiology program prepares students with the competencies necessary to pursue career opportunities as ACSM certified fitness directors (M.S. Exercise Science concentration), clinical directors of a hospital or a clinically based program which performs rehabilitation services in the realm of movement for people with disabilities (M.S. Adapted Movement Science concentration), as teachers/scholars and leaders in a University-housed Kinesiology/Exercise Science program and Human Performance Laboratory setting (Ph.D.

Kinesiology - Exercise Science concentration), and/or Pedagogy faculty settings (Ph.D. Kinesiology - Pedagogy concentration). The minimum number of credit hours for the M.S. degree is 33 and 60 hours are required for the Ph.D.

Areas of Concentration for the Master of Science Degree: Adapted movement 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. A graduate GPA of 3.0 or better is required for graduation. In addition, all degree candidates must successfully complete a written comprehensive examination.

Adapted Movement Science Concentration: (33 hours)

Required Research Component (6)

ESRM 5393 Statistics in Education and Health Professions, or

ESRM 6403 Educational Statistics and Data Processing

HHPR 5353 Research in HHPR

Required Courses (12)

PHED 5413 Adapted Physical Education

KINS 5323 Biomechanics I

KINS 5423 Assessment and Prescriptive Programming

in Adapted KINS

KINS 5513 Physiology Exercise I

Required Project or Thesis (3-6)

KINS 589V Independent Research (master's degree project), or

KINS 600V Master's Thesis

Approved Electives (9-12)

Exercise Science Concentration: (51-54 hours)

Required Research Component (6)

ESRM 5393 Statistics in Education and Health Professions, or

ESRM 6403 Educational Statistics and Data Processing

HPR 5353 Research in HHPR

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

Kinesiology (KINS)

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)

HHPR 5353 Research in HHPR

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 on Teaching in Physical Education

HHPR 5353 Research in HHPR

Required Courses: (9)

PHED 6363 Supervision in Physical Education

KINS 674V Internship: College Teaching

HHPR 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)
KINS5323 Biomechanics I (Fa) Intended to serve as an 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.
KINS5423 Assessment and Prescriptive Programming in Adapted KINS (Odd years, 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.
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 (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 (Even years, 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 (Fa) 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.
KINS5613 Physical Dimensions of Aging (Odd years, Sp) This course will focus on the physiological changes with healthy aging, pathophysiology of age-related diseases, testing issues, exercise interventions, and the psychosocial aspects of aging. Prerequisite: KINS 5513.
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 up to 6 hours of degree credit.
KINS5753 Sport Psychology (Su) Investigation of historical and contemporary research in sport psychology. Prerequisite: HKRD 5353.
KINS5773 Performance and Drugs (Sp) 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.
KINS600V Master's Thesis (Sp, Su, Fa) (1-6)
KINS605V Independent Study (Sp, Su, Fa) (1-3) Provides students with an opportunity to pursue special study of educational problems. May be repeated for up to 3 hours of degree credit.
KINS6323 Biomechanics II (Odd years, Sp) 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 (Even years, Su) 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.
KINS674V Internship (Irregular) (1-3) May be repeated for up to 3 hours of degree credit.

Health, Human Performance and Recreation (HHPR)

HHPR5353 Research in Health, Human Performance and Recreation (Sp, Su, Fa) Methods and techniques of research in health, human performance and recreation including an analysis of examples of their use and practice in their application to problems of interest to the student.
HHPR560V Workshop (Irregular) (1-6)
HHPR6233 Management in HHPR (Irregular) 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.
HHPR6333 Measurement in HHPR (Odd years, Fa) Competencies for analysis and application of evaluation and measurement in HHPR.
HHPR689V Directed Research (Sp, Su, Fa) (1-6) Laboratory investigations, in basic and applied research.
HHPR699V Seminar (Irregular) (1-3) May be repeated for up to 3 hours of degree credit.
HHPR700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

PHYSICAL EDUCATION (PHED) (M.Ed.)

The Master of Education degree in Physical Education is a 33-credit-hour program that includes a 6-credit-hour research component (statistics/research), a 21-credit-hour program core and 6 credit hours of electives. All degree candidates must successfully pass a culminating written comprehensive examination and achieve a minimum of 3.0/4.0 GPA to graduate. Two courses using Web technology (Blackboard and other online resources) will be offered every semester (Fall, Spring, Summer) and the entire degree program can be completed in a two-year period. The online Master of Education Degree program is designed to meet the needs of current professionals in the field (physical education teachers, athletic directors, coaches) who desire to attain further education and an advanced degree in 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.

Physical Education: (33 hours)

Required Research Component (6)

ESRM 5393 Statistics in Education and Health Professions OR
ESRM 6403 Educational Statistics and Data Processing Applied to
Education

HHPR 5353 Research in HHPR

Required Courses (21 hours)

PHED 5253 The Physical Education Curriculum

PHED 5273 Professional Issues in Physical Education and Sport

PHED 5243 Sport Skill Assessment and Instructional Strategies

KINS 5643 Motor Learning

KINS 5753 Sport Psychology

KINS 605V Independent Study

PHED 6363 Supervision in Physical Education

Approved Electives (6 hours)

Physical Education (PHED)

PHED5233 Research on Teaching in Physical Education (Odd years, 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.

PHED5243 Sport Skill Assessment and Instructional Strategies (Odd years, Su) The focus of this course is practical assessment techniques and instructional strategies in the area of sport and physical education activities.

PHED5253 The Physical Education Curriculum (Even years, Fa) 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.

PHED5273 Professional Issues in Physical Education and Sport (Even years, Fa) 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.

PHED5313 Risk Management in Physical Education & Athletics (Even years, Su) This course is designed to provide opportunities for the student to acquire an understanding of how to reduce the risk of injuries and eliminate hazards that may contribute to injuries associated with physical education and athletics.

PHED5413 Adapted Physical Education (Even years, Fa) Methods, techniques and special groups of physical education for the atypical child.

PHED5553 Scientific Principles of Movement and Performance (Odd years, Su) This course focuses on theoretical information about sport biomechanics and movement principles, with practical applications to the physical education of coaching profession.

PHED574V Internship (Sp, Fa) (1-6)

PHED6363 Supervision in Physical Education (Odd years, Fa) 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.

RECREATION AND SPORT MANAGEMENT (RESM) (M.Ed, Ed.D.)

The Recreation and Sport Management program prepares students with the necessary competencies to pursue career opportunities in public recreation administration, commercial recreation, sport management, community recreation, and outdoor recreation either in private or public sectors including university settings. The minimum number of credit hours required for the M.Ed. degree is 33 and 60 hours are required for the Ed.D. degree.

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 (or the equivalent on the new GRE exam).

Requirements for the Master of Education Degree: Candidates for a Master of Education degree in Recreation and 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 and Sport Management: (36 hours)

Required Research Component (6 hours)

ESRM 5393 Statistics in Education and Health Professions, or
HHPR 5353 Research in HHPR

Required Courses (15 hours)

RESM 5813 Principles of Recreation and Sport Management

RESM 5873 Leadership in RESM Service

RESM 5883 Recreation and Sport Services Promotion

RESM 5893 Public and Private Finance in RESM

RESM 6533 Legal and Political Aspects

Approved Electives (9 hours)

Capstone Requirement (6 hours)

RESM 574V Internship, or RESM 605V Independent Study, and

RESM 5853 Strategic Organizational Design in Recreation and
Sport Management, or

RESM 600V Master's Thesis

Area of Study: The program prepares qualified students for professional competence and service in the area of recreation and sport management.

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 and Sport Management, 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 and sport management. 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 and Sport Management (RESM)

RESM4023 Outdoor Adventure Leadership (Su) This course considers the values and scope of outdoor recreation programs, leadership and skill development with practical experience in a wilderness environment. The course will include a canoe trip through the wilderness, and skill training in such areas as orienteering and rock climbing; and leadership development in interpersonal and processing skills. The graduate portion of the class is geared toward leading and trip planning for taking college age and older students into remote areas.

RESM5003 Graduate Prerequisites (Fa) Gives students entering a recreation and sport degree program with no course background in recreation and sport the necessary understanding of the recreation and sport field. This course will not count toward a graduate degree in recreation and sport.

RESM5273 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.

RESM5293 Sport 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.

RESM5463 Sports Facilities Management (Su) Considers basic elements and procedures in the planning, design, construction, operation, and maintenance of sport facilities; management considerations in conducting various types of events.

RESM560V Workshop (Irregular) (1-3) May be repeated for up to 3 hours of degree credit.

RESM574V Internship (Irregular) (1-3)

RESM5813 Principles of Recreation and Sport (Su) Considers history, philosophy, current trends, basic issues, and fundamental principles of recreation and sport. Using these principles as basic criteria, students make critical appraisals of current practices in organization and administration of recreation and sport programs, program content, leadership methods, and evaluating procedures.

RESM5833 Recreation and Sport for Special Populations (Irregular) Skills, knowledge, and concepts within recreation and sport which are appropriate to planning and implementing recreation and sport programs and services for the handicapped.

RESM5843 Tourism (Fa) Explores major concepts of tourism to discover what makes tourism work, how tourism is organized, and its social and economic effects.

RESM5853 Strategic Organizational Design in Recreation and Sport Management (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.

RESM5873 Leadership in Recreation and Sport Management Services (Su) Considers research, theory, and practical applications of leadership principles utilized in the provision of recreation and sport management services. Focus is on motivation, attitude, communication, group dynamics, and problem solving.

RESM5883 Recreation and Sport Services Promotion (Su) Examines specific strategies for promoting recreation and sport programs in the local community.

RESM5893 Public and Private Finance in Recreation and Sport Management (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.

RESM600V Master's Thesis (Sp, Su, Fa) (1-18)

RESM605V Independent Study (Sp, Su, Fa) (1-3) May be repeated for up to 3 hours of degree credit.

RESM612V Directed Reading in Recreation and Sport (Sp, Su, Fa) (1-3) Critical analysis of literature in the area of recreation and sport.

RESM6133 Issues in RESM (Irregular) A review of the significant social, demographic, behavioral, developmental, and technological issues that influence health, kinesiology, and recreation and sport management programs. Pre- or Corequisite: for doctoral level students only.

RESM6533 Legal and Political Aspects (Sp) An overview of major legislation affecting recreation and sport management 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.

RESM674V Internship (Sp, Su, Fa) (1-3) Students will learn diverse teaching techniques and implement them in an ongoing undergraduate recreation and sport management 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.

Health, Human Performance and Recreation (HHPR)

HHPR5353 Research in Health, Human Performance and Recreation (Sp, Su, Fa) Methods and techniques of research in health, human performance and recreation including an analysis of examples of their use and practice in their application to problems of interest to the student.

HHPR560V Workshop (Irregular) (1-6)

HHPR6233 Management in HHPR (Irregular) 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.

HHPR6333 Measurement in HHPR (Odd years, Fa) Competencies for analysis and application of evaluation and measurement in HHPR.

HHPR689V Directed Research (Sp, Su, Fa) (1-6) Laboratory investigations, in basic and applied research.

HHPR699V Seminar (Irregular) (1-3) May be repeated for up to 3 hours of degree credit.

HHPR700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

HISTORY (HIST)

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- Distinguished Professors Sutherland, West, Woods
- Professors Brogi, Coon, Finlay, Gordon, Markham, McMath, Robinson, Sonn, Wayne, Wolpert
- Associate Professors Grob-Fitzgibbon, Pierce, Schweiger, Sloan, Starks, Williams
- Assistant Professors Antov, Arrington, Cai, Gigantino, Hare, Muntz, White

Degrees Conferred:
 M.A., Ph.D. (HIST)

Prerequisites to Degree Program: Graduate work at the master's level presupposes an undergraduate major in that subject of approximately 30 semester hours. In addition, students must have achieved cumulative undergraduate grade point average of 3.0 or a grade point average of 3.25 in the last 60 hours of undergraduate work, a minimum Verbal score of 550 and a minimum Analytical Writing score of 4.5 on the Graduate Record Examination (GRE). Students who present a minimum of 30 hours in history 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 Graduate Studies Committee. Students who present less than 18 hours of history may not be admitted without deficiency. The Graduate Studies Committee will determine the nature of the deficiency requirements.

Graduate work at the doctoral level presupposes a Master of Arts in History, although the Graduate Studies Committee will consider outstanding applicants with Master's degrees in related disciplines. Applicants ought to have at least a 3.25 GPA in their previous graduate work as well as a minimum 550 Verbal (or 156 on the new exam) and 4.5 Analytical Writing score on the GRE.

Applicants to the graduate programs in History must send all college transcripts and GRE scores to the Graduate School, to be forwarded to the department. Additionally, they must apply online at the History Department website noted above. Online materials to submit include a statement of intent describing their goals in graduate study, a resume or CV, three letters of recommendation, and a writing sample. If applicants are unable to apply online, they must contact the Graduate Director to make alternative arrangements. Master's applications are due February 1 each year; Ph.D. applications are due December 1 each year.

Requirements for the Master of Arts Degree: Students seeking the Master of Arts degree must complete at least 30 hours of history at the 4000-level and above, including HIST 5023 Historical Methods, 6 hours of HIST 600V Master's Thesis, only three hours of independent study, and a minimum of 9 seminar hours (either reading or research), and must maintain a minimum 3.0

GPA in all course work for the M.A. degree. HIST 5043 Historiography can be used to fulfill partially the seminar requirement. Of the eight required courses at the 4000 and 5000 levels, at least three must be in areas outside of the main field of specialization. Master's candidates must complete and satisfactorily defend a master's thesis in history as judged by a panel of departmental faculty.

Requirements for the Doctor of Philosophy Degree: During the first semester of study, all doctoral 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 requirement by establishing reading competency in at least one foreign language. At the discretion of the student's advisory committee, doctoral students may be required to prove reading competency in additional foreign languages if appropriate to their respective fields of research and study.

After completing the course of study prescribed by their advisory committees (with a minimum 3.0 GPA in all course work for the Ph.D. degree) 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 and an oral examination. When these examinations have been passed, students may apply for admission to candidacy. Within six months of passing the written and oral exams in all four fields, ABD students will write and defend a dissertation prospectus.

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 an oral defense of the dissertation.

History (HIST)

HIST3523 Modern China (Sp) Survey of Chinese culture, society, government and diplomacy between 1644 and the present.

HIST3693 Europe in the 20th Century (Even years, Sp) Examines the political, social, and cultural history of Europe during the twentieth century from the outbreak of the First World War to the collapse of Communist states in Eastern Europe in 1989.

HIST4003 Greece and the Ancient Near East (Irregular) 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 (Irregular) 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 (Even years, Fa) 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 (Odd years, Sp) 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.

HIST4093 The History of African Americans and Social Justice (Even years, Fa) Explores how the United States has extended social justice to African Americans during the nation's history. Examines social justice for blacks and the impact of historic policies and practices on black life today.

HIST4123 Africa and the Trans-Atlantic Slave Trade (Irregular) Examines the trans-Atlantic slave trade with a primary focus on the role of Africa and Africans in creating the unique economy and culture of the trans-Atlantic world.

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.

HIST4153 Modern Ireland, 1798-1948 (Irregular) Examines the course of Irish history from the 1798 United Irishmen rebellion to the 1948 declaration of the Republic of Ireland. Special attention is given to Catholic emancipation, the Great Famine, the Home Rule movements, the Irish War of Independence, and the Emergency (Second World War).

HIST4163 Tudor-Stuart England, 1485-1714 (Even years, Sp) Examines the history of the British Isles from the ascension of Henry VII and the Tudor dynasty until the close of the Stuart Era in 1714. Special attention is given to the English Reformation, the Elizabethan years, the 17th Century Revolutions, and the birth of an overseas Empire.

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, 1707-1901 (Even years, Fa) Examines the history of the British Isles from the 1707 Act of Union between Scotland and England until the death of Queen Victoria in 1901. Special attention is given to the spread of Empire, industrialization, and the political, social, and cultural aspects of the Georgian and Victorian Eras.

HIST4193 Great Britain, 1901-2001 (Odd years, Sp) Examines the history of the British Isles from the death of Queen Victoria in 1901 to the reelection of Prime Minister Tony Blair in 2001. Special attention is given to the collapse of the British Empire, the birth of the welfare state, and the challenges inherent in the decline of British world power.

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 (Odd years, Fa) Study of German history from the Age of Absolutism to the collapse of the German Empire at the end of the First World War. Special attention is paid to the Enlightenment and Romantic movements; nationalism and the unification of Germany; and evolving conflicts over the political and social order.

HIST4253 Germany, 1918-1945 (Irregular) Study of German history from advent of the Weimar Republic to the end of the Third Reich with emphasis upon the failure of democratic government in the 1920s and the rise and fall of the National Socialist dictatorship.

HIST4263 Independence and Africa Today (Sp) Examines the last half-century of Africa's history, focusing on the last few decades. Introduction of Africa's colonial past, revolutions and struggles for independence. Review of African development in the post-colonial and contemporary era, successes and failures of independent Africa, and the challenges the continent faces today.

HIST4283 Russia to 1861 (Fa) Study of the political, social and cultural development of Russia through the Napoleonic invasion.

HIST4303 Transatlantic Relations, 1919-Present (Irregular) US-Western European Relations, from the Wilsonian era to the present, covering strategic, economic, and cultural aspects.

HIST4313 Islamic Theology and Philosophy, 650-1700 (Irregular) Doctrines and main figures in Islamic theology and philosophy from the origins of Islam through the seventeenth century C.E.

HIST4333 Modern Islamic Thought (Irregular) Main currents in Islamic theology and political philosophy from the Ottoman Empire to the end of the twentieth century.

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.

HIST4363 The Middle East since 1914 (Irregular) Middle East since 1914 addresses European colonialism, the rise of new social elites, independence, revolution, globalization, economic self-determination, persistent regional conflicts and ongoing battles over "cultural authenticity".

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 American Civil Rights Movement (Irregular) Introduction to the history and development of the civil rights movement in the United States. (Same as AAST 4383)

HIST4393 Early Modern Islamic Empires, 1300-1750 (Odd years, Sp) An examination of the historical development of the three great Islamic empires in the early modern period- the Ottomans, the Safavids of Iran, and the Mughals of India. Special attention given to imperial expansion, administrative structures, religious-legal establishment, and the formation of distinct traditions in political ideology, historiography, and the arts and sciences.

HIST4413 New Women in the Middle East (Irregular) 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.

HIST4433 Social and Cultural History of the Modern Middle East (Irregular) 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.

HIST4463 The American Frontier (Odd years, Fa) 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.

HIST4483 African American Biographies (Irregular) Introduction to the history and intellectual development of famous and not-so-famous African Americans. (Same as AAST 4483)

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. (Same as PLSC 4303)

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. (Same as PLSC 4313)

HIST4543 American Social and Intellectual History Since 1865 (Odd years, Sp) Survey of thought and society since the Civil War.

HIST4553 The Recluse in Early East Asia (Even years, Fa) A cross-cultural study of those who chose or needed to leave the world of officialdom for the world of nature in early East Asia.

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 (Sp) 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.

HIST4603 U.S. Labor History to 1877 (Odd years, Fa) Examines the changing nature of work in U.S. history from 1607 until 1877 including the ways that workers--individually and collectively-- understand the meanings of their labor and to the ways that notions of class, gender, ethnicity, and race inform these understandings.

HIST4613 Colonial America 1600-1763 (Irregular) History of colonial America from 1600 to the end of the Seven Years War emphasizing economic, social, and cultural perspectives. Topics include Native American, French, Spanish, English, Dutch, and Russian interactions in North America and the larger Atlantic World.

HIST4623 Revolutionary America, 1763 to 1789 (Irregular) History of revolutionary America emphasizing economic, social, and cultural perspectives. Topics include historical interpretations of the causes of the war, the impact of war on African Americans, women, loyalists, elite, and poor Americans. The course also examines the formation of the new national government.

HIST4633 Heian Japan (794-1192) (Odd years, Sp) A study of courtly culture and the religious world of Heian Japan.

HIST4643 Early American Republic, 1789-1828 (Irregular) 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 (Irregular) 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 (Irregular) 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 postwar 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.

HIST4703 Emergence of Modern America, 1876-1917 (Odd years, 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 (Irregular) The impact of World War I, the 1920s, and the Great Depression upon American society and culture.

HIST4733 Recent America, 1941 to the Present (Irregular) 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 (Even 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 (Odd 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 (Odd years, 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 (Odd years, Sp) 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.

HIST4793 Colonial India, 1758-1948 (Irregular) Examines the course of Indian history from the 1758 Battle of Plassey to eventual independence from Great Britain in 1948. Special attention is given to India's place within the British Empire, particularly the East India Company, the Indian Mutiny, the Raj, the rise of Gandhi, and India's independence movement.

HIST4853 Early Chinese Empires: Mythology, Archeology, and Historiography (Sp) A critical introduction to the most important sources and major themes, both textual and archeological, for the study of early China.

HIST4853H Honors Early Chinese Empires: Mythology, Archeology, and Historiography (Sp) A critical introduction to the most important sources and major themes, both textual and archeological, for the study of early China.

HIST4863 Classical Thought in East Asia (Fa) Introduces the major East Asian philosophical and religious traditions including Confucianism, Daoism, Buddhism, and Shintoism. Read original sources in translation, such as Analects, and explore perspectives that stem from the traditions as they bear on contemporary global issues.

HIST4863H Honors Classical Thought in East Asia (Fa) Introduces the major East Asian philosophical and religious traditions including Confucianism, Daoism, Buddhism, and Shintoism. Read original sources in translation, such as Analects, and explore perspectives that stem from the traditions as they bear on contemporary global issues.

HIST4873 Germany since 1945 (Even years, Fa) Examines the history of Germany since the end of the Second World War including political division and economic recovery, dissident movements in East Germany and alternative cultures in West Germany, reunification in 1990, and the legacy of Nazism and the Holocaust.

HIST4883 Health and Disease: 1500 to the present (Irregular) Explores the emergence of epidemics against the backdrop of the nation state and anxieties over women, the lower classes, and other marginalized groups. The rise of modern health programs illuminates the cultural construction of medicine, the biases of scientific inquiry, and the tensions among paternalism, liberty, and prejudice.

HIST4903 Music and the Arts of Edo Japan (1600-1868) (Odd years, Fa) A music and arts view of urban and popular culture of the Edo period of Japan (1600-1868). Readings drawn from history, literature, aesthetics, religion and science.

HIST4903H Honors Music and the Arts of Edo Japan (1600-1868) (Odd years, Fa) A music and arts view of urban and popular culture of the Edo period of Japan (1600-1868). Readings drawn from history, literature, aesthetics, religion and science.

HIST4913 Reading Japanese Noh as Cultural History (Even years, Fa) A historical, socio-cultural, and inter-arts approach to the medieval lyric-drama Japanese Noh, a form of masked theater with roots reaching beyond the 14th century.

HIST4913H Honors Reading Japanese Noh as Cultural History (Even years, Fa) A historical, socio-cultural, and inter-arts approach to the medieval lyric-drama Japanese Noh, a form of masked theater with roots reaching beyond the 14th century.

HIST4923 Song China (960-1279) (Odd years, Fa) Examination of the Song dynasty (960-1279) concentrating on the education and role of the scholar-official and the literatus. Readings drawn from history, literature, personal diaries, travel accounts, political memoranda, and scientific writings.

HIST4923H Honors Song China (960-1279) (Odd years, Fa) Examination of the Song dynasty (960-1279) concentrating on the education and role of the scholar-official and the literatus. Readings drawn from history, literature, personal diaries, travel accounts, political memoranda, and scientific writings.

HIST4933 Ad Paradisum: Utopias, imaginary places, and the afterlife in East Asia (Odd

years, Fa) Confucian, Daoist, and Buddhist ideas of ideal communities ('utopias'), of imaginary places ('paradise islands'), and of the afterlife ('heaven and hell') in East Asia will be traced in a broad sweep across literature, painting, and the performing arts.

HIST4933H Hon Ad Paradisum: Utopias, imaginary places, and the afterlife in East Asia (Odd years, Fa) Confucian, Daoist, and Buddhist ideas of ideal communities ('utopias'), of imaginary places ('paradise islands'), and of the afterlife ('heaven and hell') in East Asia will be traced in a broad sweep across literature, painting, and the performing arts.

HIST4943 U.S. Labor History, from 1877-present (Even years, Sp) This course will examine the changing nature of work in U.S. history from 1877 until the present. It will pay particular attention to the ways that workers--individually and collectively--understand the meanings of their labor and to the ways that notions of class, gender, ethnicity, and race inform these understandings.

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 (Irregular) 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 (Irregular) Concentrated reading in selected specialized areas of Asian history. Prerequisite: Advanced graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5063 Readings in European History (Irregular) (1-6) Prerequisite: Graduate standing.

HIST5073 Readings in American History (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5083 Research Problems in European History (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

HIST5093V Research Problems in American History (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

HIST5103 Reading Seminar in American History (Irregular) 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 up to 3 hours of degree credit.

HIST5113 Research Problems in Latin American History (Irregular) (1-6)

HIST5123 Research Seminar in American History (Irregular) 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 up to 3 hours of degree credit.

HIST5133 Reading Seminar in European History (Irregular) 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 up to 3 hours of degree credit.

HIST5143 Research Seminar in European History (Irregular) Research projects in selected fields of European history, such as the French Revolution, humanism, etc. Prerequisite: Graduate standing. May be repeated for up to 3 hours of degree credit.

HIST5153 Reading Seminar in British History (Irregular) Historiographical and bibliographical study of selected periods of British history. May be repeated for up to 6 hours of degree credit.

HIST5163 Research Seminar in British History (Irregular) Research projects in selected fields of British history. May be repeated for up to 6 hours of degree credit.

HIST5173 Readings in Asian History (Irregular) (1-6) Prerequisite: Graduate standing.

HIST5183V Research Problems in Asian History (Irregular) (1-18) Prerequisite: graduate standing.

HIST5213 Reading Seminar in Middle Eastern History (Irregular) Historiographical and bibliographical study of special areas of Middle Eastern history. Prerequisite: Graduate standing. May be repeated for up to 3 hours of degree credit.

HIST5223V Readings in Latin America History (Irregular) (1-6)

HIST5233 Research Seminar in Middle Eastern History (Irregular) Research projects in selected fields of Middle Eastern history. Prerequisite: Graduate standing. May be repeated for up to 3 hours of degree credit.

HIST5243V Readings in African History (Irregular) (1-6)

HIST5253V Research Problems in African History (Irregular) (1-6)

HIST5263V Readings in Middle Eastern History (Irregular) (1-6)

HIST5273V Readings in Medieval History (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5283V Research Problems in Middle Eastern History (Irregular) (1-6)

HIST5293V Research Problems in Medieval History (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5313 Reading Seminar in Latin American History (Irregular) Historiographical and bibliographical study of special areas in Latin American history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5323 Research Seminar in Latin American History (Irregular) A research seminar for the production of a major research project in Latin American history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5333V Readings in Ancient History (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5343V Research Problems in Ancient History (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5353 Reading Seminar in Medieval History (Irregular) Historiographical and bibliographical study of special areas in medieval history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5363 Research Seminar in Medieval History (Irregular) A research seminar for the production of a major research project in medieval history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5373 Reading Seminar in Ancient History (Irregular) Historiographical and bibliographical study of special areas in ancient history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5383 Research Seminar in Ancient History (Irregular) A research seminar for the production of a major research project in ancient history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5413 Reading Seminar in African History (Irregular) Historiographical and bibliographical study of selected periods and/or topics in African history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5423 Research Seminar in African History (Irregular) A seminar for the production of a major research project in selected fields of African history. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

HIST5703V Special Topics (Irregular) (1-6) Prerequisite: Graduate standing. May be repeated for up to 9 hours of degree credit.

HIST6003 Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

HIST7003V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy. May be repeated for up to 18 hours of degree credit.

HORTICULTURE (HORT)

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- University Professor Clark
- Professors Evans, Garcia, Hensley, Murphy, Richardson, Robbins, Rom
- Adjunct Professors Daniello, Murdoch
- Associate Professors Andersen, Karcher, Lindstrom, Srivastava
- Adjunct Associate Professors Owens, Rainey, Sambo
- Assistant Professor McDonald

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 Problems Research
 1 hour HORT 5001 Seminar
 9 hours HORT Courses
 BIOL 4304 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, AGECE, 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 143 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 credit.

HORT402V Horticulture Judging and Competition Activity (Irregular) (1-6) Training for and participation on horticultural identification, judging and competitive teams. Prerequisite: HORT 2003. May be repeated for up to 4 hours of degree credit.

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.

HORT4043 Professional Landscape Management (Odd years, Fa) 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. Corequisite: Lab component. Prerequisite: HORT 2003.

HORT4403 Plant Propagation (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. Prerequisite: BIOL 1613 and BIOL 1611L.

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 1073.

HORT4801L Greenhouse Crops Production 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 Greenhouse Crops Production (Even years, Sp) Principles and practices of production and marketing of crops commonly grown in controlled environments including flowering containerized herbaceous species, geophytes, annual and perennial bedding plants, hydroponic vegetables and herbs. 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. Prerequisite: HORT 4903.

HORT4932 Turf Best Management Practices (Odd years, Sp) The course covers the impacts of turfgrass management practices on turf quality and the environment. In addition, the identification, biology, and control practices for the major insects, diseases, and weeds that infest turf will be covered. Emphasis will be placed on management strategies that include both chemical and non-chemical approaches to the prevention and control of common turfgrass pests.

Prerequisite: HORT 2303 and 6 hours selected from CSES 2003, PLPA 3004, and ENTO 3013.
HORT5001 Seminar (Sp, Fa) Review of scientific literature and oral reports on current research in horticulture. May be repeated for up to 4 hours of degree credit.
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 2323 and BIOL 2321L (or ANSC 3123 and CSES 4103).
HORT5103 Plant Growth and Development (Fa) This course will focus on environmental and developmental processes of plant growth and development. A student completing this course should have an understanding of the developmental processes of plant growth and how environmental factors interact to affect and control plant growth and development.
HORT5203 Temperature Stress Physiology (Sp) This course will teach students how to apply biological, chemical and physical principles to models of how plants are damaged by temperature extremes and how they change to increase resistance. Student will apply these principles to better understand plant responses to other environmental challenges, including both biotic and abiotic stresses.
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 credit.
HORT6033 Genetic Techniques in Plant Breeding (Irregular) In-depth 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 2323 and BIOL 2321L (or ANSC 3123 and CSES 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 143 for graduate courses in Plant Science.

HUMAN ENVIRONMENTAL SCIENCES, SCHOOL OF (HESC)

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<http://www.uark.edu/depts/hesweb/>

- Professors Farmer, Harrington, Robertson, Turner, Warnock
- Associate Professors Apple, Bailey, Killian, Revelle, Southward
- Assistant Professors Henk, Ogbeide, Smith, Way, Wiersma
- Clinical Assistant Professor Moore
- Instructors Baldwin, Carpenter, Crandall, Harding, Powell

Degree Conferred:
 M.S. (HESC)

Areas of Study: Apparel studies; food, human nutrition and hospitality; human development and family sciences; and general human environmental sciences.

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.

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 up to 6 hours of degree credit.
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. Lecture 2 hours, Laboratory 2 hours per week. Prerequisite: HESC 2023, 3013 and 3033.
HESC4033 Advanced Textile Study (Sp, Fa) Use of advanced computer-aided-design (CAD) software to enhance skills in textile studies in a computer laboratory environment. Lecture 2 hours, Laboratory 2 hours per week. 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.
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.
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 in a computer laboratory environment. Laboratory 6 hours per week. 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 2112 and HESC 2111L and CHEM 1073 and CHEM 1071L) and AGST 4023 or STAT 2303 or PSYC 2013.
HESC4213 Advanced Nutrition (Fa) Normal nutrition with emphasis on utilization of nutrients. Lecture and reports on current literature 3 hours per week. Prerequisite: CHEM 3813 and HESC 3203.
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) Under the direction of the instructor, each student will select a nutrition topic and will then study the current peer-reviewed literature related to that topic, and prepare and present an individual in-depth present for their class. The presentation should be appropriate for presentation to medical doctors and other health care providers in a post-baccalaureate internship or clinical work setting. The class will meet weekly for students to give their individual presentations. Prerequisite: HESC 3203. May be repeated for up to 2 hours of degree credit.
HESC4423 Adult Development (Fa) Examine individual development beginning with the transition adulthood through middle age; approximate 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.
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 and COMM 1313.
HESC4463 Administration and Leadership in the Helping Professions (Fa) Planning, developing, operating, and evaluating programs in the helping professions, including child care and family-related agencies. Emphasis will be on administrators' roles as leaders in organizations. Topics include facilities, budget, staff development, and policy manuals. Prerequisite: HDFS major and senior standing or permission from instructor.
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. Prerequisite: RSOC 2603 or SOCI 2013.

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 up to 6 hours of degree credit.

HESC4633 Hospitality Operations and Financial Analysis (Sp) This course is an in-depth, comprehensive study of hospitality operations, with emphasis on financial statements and other accounting reports that are usually used by management staffs for strategic decision making. It includes the application of computer software and human resource management skills. Corequisite: HESC 3633. Prerequisite: AGEC 2142/2141L or WCOB 1023.

HESC4753 Family Financial Management (Sp, Fa) Economic considerations of the family in a rapidly changing society. Family finance and consumer problems are emphasized.

HESC4901 Apparel Studies Pre-Study Tour (Sp) (Even years, Fa) A study of specific regional and international fashion markets for apparel studies in preparation for HESC 4912 APST Study Tour. The course examines the design, production, distribution and retailing of fashion goods from couture fashion to mass markets. Prerequisite: 2.0 minimum GPA. APST majors only. May be repeated for up to 4 hours of degree credit.

HESC4912 Apparel Studies Study Tour (Su) (Even years, Fa) An on-site study of specific regional and international fashion markets for apparel studies. Course further examines the design, production, distribution and retailing of fashion goods from couture fashion to mass markets as outlined in HESC 4901. Course includes study trip; length based upon destination. Additional fees required. Prerequisite: Minimum 2.0 GPA and HESC 4901. APST majors only. May be repeated for up to 8 hours of degree credit.

HESC5003 Apparel Studies in the Global Economy (Even years, Fa) Analysis of economic, social and political aspects of the domestic and international textile and apparel industries. Lecture 3 hours.

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.

HESC5023 Social, Psychological and Cultural Aspects of Dress (Odd years, Fa) Integration of social, psychological and cultural theories as they apply to appearance and clothing behavior. Lecture 3 hours.

HESC502V Special Problems Research (Sp, Su, Fa) (1-6)

HESC5033 Issues and Trends in Textile Studies (Odd years, Sp) Studies of advances in textile science and recent developments in the textile industry. Lecture 3 hours.

HESC5043 Theories and Practices in Apparel Merchandising (Even years, Sp) Theoretical perspectives, concepts and current practices that influence apparel merchandising. Lecture 3 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 to nourishing aging and elderly adults. Factors that affect food choices and eating behavior are also considered. Lecture 3 hours per week. On campus and web-based delivery is offered. Prerequisite: Graduate standing and consent of instructor.

HESC522V Readings in Nutrition (Sp) (1-6) Seminar and individual study. Prerequisite: HESC 4213 or HESC 4223 or ANSC 3143.

HESC5263 Medical Nutrition Therapy I (Fa) Principles of medical nutrition therapy with emphasis on Nutrition Care Process, and the pathophysiology and current standards of practice for diseases and disorders. Lecture 3 hours, laboratory 3 hours per week. Prerequisite: Graduate standing and consent of instructor.

HESC5273 Medical Nutrition Therapy II (Sp) Principles of medical nutrition therapy with emphasis on the Nutrition Care Process, and the pathophysiology and current standards of practice for diseases and disorders. Lecture 3 hours per week. Prerequisite: HESC 5263.

HESC5403 Advanced Studies in Family Relations (Fa) This course examines family relationships in cultural and ethnic contexts. It reviews family theories, current research, and policy issues related to marriage and family in context. The course explores marriage and family relationships across the lifespan. 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 Studies in Child Development (Sp) An in-depth examination of issues in development during infancy, early, and middle childhood. Developmental theory and accomplishments/milestones are studied in the biocultural context. Emphasis is on review and analysis of classic and recent research literature and on evaluation of theoretical perspectives based on research evidence.

HESC5443 Gerontology (Sp) Examines physiological and psychological development of the aging individual, extended family relationships, service networks for older adults, and retirement activities. Some attention given to housing and care needs of persons in advanced years. Lecture 3 hours per week, seminar format. Prerequisite: Graduate standing. (Same as GERO 5443)

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 AGED 5463)

HESC5643 Meetings and Convention Management (Fa) Focuses on the planning and management of meetings and conventions in the hospitality industry.

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.

HESC5663 Critical Issues and Trends in Hospitality and Tourism (Sp) The hospitality industry is arguably one of the most important sources of income and foreign exchange and is growing rapidly. However, national and international crises have huge negative economic consequences. This course explores change in the world and applies this to forecasting change in the hospitality and tourism industries. This course examines the current state of the industry and makes educated predictions to the future of the lodging, cruise, restaurant, technology, and travel and tourism industries.

HESC5683 Food and Wine Management, Service and Evaluation (Fa) This course provides students with knowledge of the sensory relationship of wine and food and the important role this process has on gastronomic satisfaction and gastronomic tourism. Course topics will include developing and marketing the wine/food tourism product, wine and food pairing as a hierarchical process, gastronomic identity, Old and New World traditions, managing a food and wine program, trends in food and wine, and promoting Arkansas food and wine. Students must be at least 21 years old. Students are required to complete an alcohol compliance education program prior to taking course. Students who may not imbibe for any reason should speak with the instructor about an accommodation and alternative assignments. Limited to hospitality graduate students only. Prerequisite: Restricted to graduate students in HESC, must be 21 years old, completion of alcohol compliance education program.

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 108 for graduate courses in Food Science.

RURAL SOCIOLOGY (RSOC)

See also Sociology on page 161 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)

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 up to 6 hours of degree credit.

RSOC5603 Community and Natural Resources (Irregular) Introduction to the breadth of considerations involved in community resource management, including theoretical frameworks, methodological investigations and applied practices to enhance the ability of community development professionals to work with their communities to plan, develop and monitor the conservation and development of natural resources with multiple functions.

RSOC600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

RSOC700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

HUMANITIES (HUMN)

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INDUSTRIAL ENGINEERING (INEG)

Kim Needy
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- Distinguished Professors Rardin, White
- Professors Cassady, Johnson, Meller, Needy, Rossetti
- Associate Professors Buyurgan, Chimka, Fant, Nachtmann, Nam, Pohl
- Adjunct Associate Professor Gattis
- Assistant Professors Milburn, Rainwater, Root, Zhang

Degrees Conferred:

- M.S.I.E. (INEG)
- M.S.O.M. (OPMG) (See Operations Management)
- M.S.E. in Engineering (ENGR) (See Engineering)
- 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, quality control/reliability, and health care/transportation logistics.

Primary Areas of Faculty Research: Automation and robotics; economic decision analysis; electronics manufacturing; engineering and quality management; ergonomics, human factors and safety; health care; manufacturing and transportation logistics; material handling and warehousing systems; operations research; quality, reliability, maintainability; and scheduling.

Application to the Graduate Program: Follow the procedures outlined by the Graduate School. To receive full consideration for assistantships and other financial aid, applications must be received before February 1.

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 INEG 600V Master's 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.

artifacts so that human well-being and system performance are optimized in work environments. Prerequisite: CSC2004

INEG4423 Advanced Engineering Economy (Irregular) 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 2413.

INEG4433 Systems Engineering and Management (Fa) Overview of the fundamental concepts underlying the management of engineering. Reviews the engineering decision process within the life cycle. Examines implementation of basic management functions in technical organizations and development of strategy tools within a complex organization. Prerequisite: INEG 2403

INEG4443 Project Management (Irregular) Analysis of the strategic level of project management including planning, organizing, and staffing for successful project execution. Professional creativity, motivation, leadership, and ethics are also explored. At the tactical level, project selection, control, and systems management are analyzed. Systems development and decision support tools for project management are studied. Prerequisite: Senior standing.

INEG4453 Productivity Improvement (Irregular) 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.

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 (Fa) Strategy and competition, forecasting, aggregate planning, inventory control subject to known demand, inventory control subject to uncertain demand, supply chain management, push and pull production control systems, and operations scheduling. Pre or Corequisite: INEG 3613. Prerequisite: INEG 2313.

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.

INEG4583 Renewable Energy: Green Power Sources (Sp) Current developments in renewable energy from a green power source where electricity, heating and fuel supply can be obtained other than typical energy sources. Technical and economical feasibilities and economic analyses of renewable energy considered for use in residential, small businesses, and industrial complexes. Prerequisite: Senior standing.

INEG4593 Manufacturing Systems (Irregular) This course is designed to highlight the major topics in manufacturing systems. Different manufacturing models and metrics are emphasized. This course also introduces classification, general terminology, technical aspects, economics, and analysis of manufacturing systems. Corequisite: Lab component. Prerequisite: INEG 2513 or graduate standing.

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 2333 and INEG 3713.

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 2333.

INEG4833 Introduction to Database Concepts for Industrial Engineers (Irregular) An introduction to the basic principles of database modeling and technologies for industrial engineers. Coverage includes analyzing user requirements, representing data using conceptual modeling techniques (e.g. UML, ERD), converting conceptual models to relational implementations via database design methodologies, extracting data via structured query language processing, and understanding the role of database technology in industrial engineering application areas such as inventory systems, manufacturing control, etc. The application of a desktop database application such as Access will be emphasized. Prerequisite: CSC2004.

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 Special Topics in Industrial Engineering (Irregular) (1-3) Consideration of current industrial engineering topics not covered in other courses. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

INEG515V Individual Study in Industrial Engineering (Sp, Su, Fa) (1-3) Opportunity for individual study of advanced subjects related to a graduate industrial engineering program to suit individual requirements. Prerequisite: Graduate standing.

INEG5243 Automated Manufacturing (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.

INEG5313 Engineering Applications of Probability Theory and Stochastic Processes (Fa) 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 2313 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 2313 or equivalent.

INEG5333 Design of Industrial Experiments (Irregular) Statistical analysis as applied to problems and experiments in engineering and industrial research; experiment design and analysis; probability; and response surface analysis. Prerequisite: INEG 3333 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 2313.

INEG5363 Generalized Linear Models (Irregular) Introduce the generalized linear model (GLM), inference, likelihood and diagnostics. Apply log linear and logistic models. Develop techniques for growth curves, and longitudinal and survival data. Cover spatial and normal linear models, and dynamic GLM for dependent data.

Industrial Engineering (INEG)

INEG4223 Occupational Safety and Health Standards (Irregular) 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: INEG 2313.

INEG4323 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: Senior standing.

INEG4343 Cognitive Ergonomics (Irregular) Studies of human cognition in work settings in order to enhance performance of cognitive tasks through an understanding of cognitive processes (e.g., attention, perception errors, decision making, workload) required of operators in modern industries. Emphasis lies on how to (re)design human-machine interfaces and cognitive

INEG5373 Repairable Systems Modeling (Irregular) Applications of probability, statistics, simulation and optimization to problems related to 1) modeling the performance of repairable equipment; 2) designing optimal inspection and maintenance policies for repairable equipment; and 3) optimizing the allocation of maintenance resources.

INEG5383 Risk Analysis for Transportation and Logistics Systems (Irregular) Fundamentals of modeling risk, analyzing risk, and managing risk in a variety of industrial and government decision-making settings. Risk measurement and model building, uncertainty quantification, and multi-objective trade-offs. Credit cannot be earned for both INEG 4383 and INEG 5383.

INEG5393 Applied Regression Analysis for Engineers (Irregular) Present concepts and applications to introduce statistical tools for discovering relationships among variables. Focus on fitting and checking linear and nonlinear regression models. Practical tools for engineers.

INEG5433 Cost Estimation Models (Irregular) 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 3333. (Same as OMT 5433)

INEG5443 Decision Models (Irregular) 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, Analytic Hierarchy Process, Bayes Theorem, Monte Carlo simulation, utility theory, risk analysis, group decision making and expert systems. Prerequisite: INEG 2313. (Same as OMT 5443)

INEG5523 Topics in Automated Systems (Irregular) To understand current developments in applications of flexible automation to industrial processes. Robotics, machine vision and other sensors, human machine interface, AML/2 and V+ programming languages.

INEG5533 Transportation Logistics (Irregular) Topics in transportation logistics of interest to engineers: routing and location analysis, fleet sizing, logistics facilities design, applications of Geographic Information Systems (GIS) and Global Positioning System (GPS) technologies to transportation systems modeling and analysis. Prerequisite: INEG 5613.

INEG5543 Distribution Center Design & Operations (Irregular) To introduce the student to the field of facility logistics, as applied to distribution centers (DCs). The fundamental areas of facility design and operations (material handling systems) will be covered. Prerequisite: INEG 5613

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.

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 (Irregular) 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 2313.

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-Khinchine 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.

INEG5683 Nonlinear Programming (Irregular) An introduction to the theory and methodology of nonlinear programming. Focus on engineering and management science applications of nonlinear optimization. Both single and multi-variable as well as unconstrained and constrained problems are addressed.

INEG5693 Heuristic Optimization (Irregular) Theory and applications of methodological approaches explicitly addressed to heuristic or approximate optimization of integer and combinatorial models. Prerequisite: INEG 5613.

INEG5803 Simulation (Irregular) The development and use of discrete-event simulation models for the analysis and design of systems found in manufacturing, distribution, and service contexts. Coverage includes conceptual modeling, model translation to computer form, statistical input models, random number generation and Monte Carlo methods, experimentation and statistical output analysis, and queuing analysis. Includes the use of modern computer simulation languages.

INEG5813 Introduction to Simulation (Irregular) Development and use of discrete-event simulation models for the analysis and design of systems found in manufacturing, distribution, and service contexts. Coverage includes conceptual modeling, model translation to computer form, statistical input models, random number generation and Monte Carlo methods, experimentation and statistical output analysis, and queuing analysis. For off-campus, distance education students only.

INEG5823 Systems Simulation I (Irregular) Random number generation, random variate generation, timekeeping in simulations, discrete event modeling, construction of digital simulation models, statistical analysis of simulation results, and analysis of simulation experiments utilizing a computer programming language. Prerequisite: INEG 3623 or INEG 5803 or equivalent.

INEG5843 Scheduling and Sequencing I (Irregular) 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.

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 5823.

INEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

INFORMATION SYSTEMS

See the Graduate School of Business, page 189.

INTERDISCIPLINARY STUDIES, DIVISION OF

Todd Shields

Dean of the Graduate School and International Education

50 Stone House North

479-575-4401

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Degrees Conferred:

M.S., Ph.D. in Cell and Molecular Biology (CEMB)

M.S., Ph.D. in Microelectronics-Photonics (MEPH)

Ph.D. in Public Policy (PUBP)

M.S., Ph.D. in Space and Planetary Sciences (SPAC)

Certificates Offered (non-degree)

Cross-Sector Alliances (CSAL)

Preparing for the Professoriate (PROF)

Sustainability (SUST)

Undergraduate Minor Offered:

Microelectronics-Photonics (Please see undergraduate Catalog of Studies)

Housed in the Graduate School, the Division of Interdisciplinary Studies is the home department for the cross-college interdisciplinary graduate programs: Graduate Certificates in Cross-Sector Alliances, Preparing for the Professoriate, and Sustainability; M.S. and Ph.D. degrees in Cell & Molecular Biology; M.S. and Ph.D. degrees in Microelectronics-Photonics; Ph.D. degree in Public Policy; and M.S. and Ph.D. degrees in Space & Planetary Sciences. Program descriptions and course requirements may be found elsewhere in this catalog and on the Web.

The Division of Interdisciplinary Studies is also the home department for one undergraduate minor in Microelectronics-Photonics. The program description and course requirements may be found in the undergraduate Catalog of Studies.

The common feature of these interdisciplinary programs is that their faculty members have voluntarily associated themselves with that academic community while being appointed faculty in our traditional departments. Each program operationally reports directly to the Associate Dean of the Graduate School, but works closely with the traditional departments that house actively participating program faculty members.

Graduate Education Courses (GRSD)

GRSD400V Research Experience Undergraduate Internship (Su) (1-6) Internship for students participating in an undergraduate research experience. May be repeated for up to 12 hours of degree credit.

GRSD5003 The Professoriate: Teaching, Learning and Assessment (Sp) Designed to introduce the future academic professional to the expectations of the faculty teaching role in higher education. Topics include techniques of effective teaching and learning, dealing with a variety of institutional expectations, course management issues, and using models of effective teaching across a broad spectrum of class sizes and levels.

GRSD5013 Field Experience in Gerontology (Irregular) Supervised research/practical experience in field setting. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

GRSD5013 Practicum for Future Faculty (Irregular) This course is designed to follow GRSD 5003 and to give participants opportunities to apply theories and methods learned in that course. To accomplish these goals, the course instructor helps the participant arrange a mentoring opportunity as part of this course. Prerequisite: GRSD 5003. May be repeated for up to 6 hours of degree credit.

GRSD502V Special Topics in Preparing Future Faculty (Irregular) (1-3) Seminar on selected topics for those anticipating a career teaching in higher education. May be repeated for up to 6 hours of degree credit.

GRSD5033 The Professoriate: Research and Service (Fa) Designed to complement GRSD 5003 by focusing on topics of interest to future academic professionals beyond those related to instruction. Topics include developing a research statement, strategies for securing an academic position the general nature of employment and service expectations in higher education, research ethics, and funding issues, including grant proposal writing.

JAPANESE

See World Languages, Literatures, and Cultures, page 164.

JOURNALISM, WALTER J. LEMKE DEPARTMENT OF (JOUR)

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- Professors Carpenter, Foley, Purvis, Wicks
- Associate Professors Coustaut, Fosu, Jordan, Miller, Watkins
- Assistant Professors Kirkpatrick, Schulte
- Instructors Martin, Shurlds, Starling Ledbetter

Degree Conferred:
M.A. (JOUR)

Areas of Study: Advanced journalism studies in, or combining courses from, news/editorial, broadcast/documentary or advertising/public relations. Journalism studies are supplemented with graduate-level requirements in a second academic discipline.

The purposes of the interdisciplinary program are to refine the conceptual knowledge and skills of graduate journalism students through advanced writing, production and/or theory and methods courses, to offer comprehensive, media-related courses; and to provide expertise in an additional academic discipline.

Prerequisites to Degree Program: Students must have appropriate professional experience and/or an undergraduate degree in the journalism field that is approved by the graduate coordinator or the Journalism Graduate Faculty Committee as preparation for graduate study. A student

must have a minimum undergraduate grade-point average of 3.00 and must earn a minimum score of 300 on the verbal and quantitative parts of the Graduate Record Examinations (including a minimum score of 151 on the verbal part), and a minimum score of 4.5 on the analytical writing section.

Requirements for the Master of Arts Degree: In addition to the requirements of the Graduate School (page 44), 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; all students must take JOUR 5043 Research Methods.
2. 12 hours of graduate credit in a single department other than journalism chosen by the student and approved by the graduate coordinator or the Journalism Graduate Faculty Committee, and
3. a master's thesis (6 semester hours).

Journalism (JOUR)

JOUR4033 Advanced Radio News Reporting (Sp) Intensive training in the production of in-depth, public radio style news stories. Prerequisite: JOUR 2032 and JOUR 2031L

JOUR4063 Computer-Assisted Publishing (Irregular) In-depth, 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 (Irregular) 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 Magazine Writing (Sp) This intensive writing and reporting course is for students with proven feature-writing skills and an interest in the human-interest stories found in such leading magazines as The New Yorker, Esquire, Harper's, the Atlantic, and others. Students will compose magazine-length nonfiction stories on timely subjects under deadline. Stories are submitted for contests and publication, when possible. Prerequisite: JOUR 3123.

JOUR4883 Advanced Television News Production (Irregular) Continuation of JOUR 4873. Students prepare and present television newscasts for air. Laboratory component arranged. Corequisite: Lab component. Prerequisite: JOUR 4873.

JOUR4903 Community Journalism (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 (Irregular) 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 (Irregular) 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) 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.

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 (Irregular) Examines and analyzes the means of influencing and measuring public opinion, with an emphasis on survey research and polling.

JOUR5183 International Mass Communications (Irregular) 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 for up to 6 hours of degree credit.

JOUR5233 Media and Public Policy (Irregular) 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 (Irregular) A study of superior works of non-fiction 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, pre-production 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.

JOUR5923 History of the Black Press (Even years, Sp) Covers the historic context of contributions and innovations to U.S. newspapers by African Americans. Also investigates the role of the black press from its beginnings in 1827 through the civil rights movement.

JOUR600V Master's Thesis (Sp, Su, Fa) (1-6) Required of all M.A. journalism students.

KINESIOLOGY

See listing in the Health Sciences, Kinesiology, Recreation and Dance, page 115.

MANAGEMENT (MGMT)

See Graduate School of Business, page 192.

MARKETING AND LOGISTICS (MKTL)

See Graduate School of Business, page 193.

**MATHEMATICAL SCIENCES,
DEPARTMENT OF (MASC)**

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- Distinguished Professor Schein
- Professors Akeroyd, Brewer, Capogna, Cochran, Feldman, Goodman-Strauss, Lanzani, Luecking, Madison, Ryan
- Associate Professors Arnold, Harrington, Johnson, Meaux, Meek, Petris, Rieck, Song
- Clinical Associate Professor Korth
- Assistant Professors Clay, Day, Raich, Tjani, Van Horn-Morris
- Clinical Assistant Professors Harriss, 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 5001, MATH 504V, MATH 507V, MATH 5013, and MATH 5033 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.

All candidates must complete a minimum of 32 semester hours of approved graduate course work, including 12 semester hours in mathematics at the 5000-6000 level (excluding MATH 510V). All selected courses are subject to the approval of the Graduate Committee.

Students in the general option may include up to nine semester hours of graduate work in courses outside the department. The comprehensive examination for the general option will include material covered in graduate course work.

The candidate for the computational mathematics option must include at least six but not more than twelve semester hours of graduate work in courses outside of mathematics. The comprehensive examination for the computational mathematics option will include material covered in six semester hours of graduate courses in each of numerical analysis, applied mathematics, and analysis.

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 30 semester hours of graduate work.

Prospective candidates for the Master of Arts degree in secondary mathematics are expected to have earned a baccalaureate degree or equivalent with a major in a mathematical science (mathematics, statistics, operations research, or computer science), engineering, or a physical science, and credit in courses equivalent to MATH 2564, MATH 3083, MATH 3113, and MATH 3773.

The program has four components in which to earn a minimum of 30 semester hours of credit:

1. Graduate course work in mathematics content and content-based pedagogy. At least 12 hours of credit in graduate course work specifically designed for preparation for teaching secondary mathematics. The content will include probability, statistics, algebra, geometry, applied mathematics and advanced calculus with connections to secondary school mathematics. At least one of the courses must be in probability and statistics; one in algebra; and one in advanced calculus. Candidates will sit for examinations in three of the following areas: probability and statistics; algebra; geometry; advanced calculus; and mathematics education. Candidates will also present a portfolio describing the body of work with samples of student work and explanations of connections to secondary school mathematics. These courses are to be selected from MATH 4103, MATH 4153, MATH 4353, MATH 4363, STAT 4003 (with corequisite STAT 4001L) STAT 5103, MATH 5001, MATH 504V, MATH 5013, and MATH 5033. Other graduate mathematics or statistics courses may be used in place of these courses with the approval of the student's committee.
2. Independent study and research in mathematics or mathematics education. From three to six hours of credit is available in independent study and research under the direction of mathematical sciences faculty. The results will be evidenced by a report roughly equivalent to a master's thesis.
3. Advanced work in professional teacher preparation. Up to six hours of credit in MATH 507V is available for advanced work in preparation for teaching AP calculus, AP statistics, International Baccalaureate (IB) mathematics, or for achieving National Board

Certification in (Adolescence and Young Adulthood) Mathematics. Other professional development activities with quality control features similar to those of the AP, IB, and National Board programs may be presented for consideration for credit. All such work must be sanctioned by the sponsoring organizations.

- Graduate courses in education. Up to six hours of credit is available in graduate courses in education. The student's committee must approve the courses. Recommended courses include CIED 5483, 6013, 6023, 6033, 6043, and 6053. Other graduate courses in education may be used in place of these courses with the approval of the student's advisory committee.

If allowed by Graduate School rules, credit previously earned may be applied to the requirements for this degree with the approval of the student's advisory committee.

Each person receiving the Master of Arts degree in secondary mathematics must pass a written examination in three of the following areas: probability and statistics; algebra; geometry; advanced calculus; and mathematics education. No student will be allowed to take the examination more than three times. Candidates will also present a portfolio describing the body of work with samples of their work as students and explanations of connections to secondary school mathematics.

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 course requirements for the M.S. degree. The prospective candidate for the Ph.D. will be allowed to take the examination at most two times. A second failure to qualify eliminates a student from the graduate program in mathematics. After qualifying, a candidacy examination will be given covering the intended areas of specialization beyond the level of the qualifying comprehensive examination. It may be repeated once.

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 commutative rings, quadratic field extensions, Gaussian integers, Wedderburn's theorem, and multilinear algebra. Prerequisite: MATH 3113.

MATH4153 Mathematical Modeling (Irregular) 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 2584.

MATH4163 Dynamic Models in Biology (Irregular) Mathematical and computational techniques for developing, executing, and analyzing dynamic models arising in the biological sciences. Both discrete and continuous time models are studied. Applications include population

dynamics, cellular dynamics, and the spread of infectious diseases. Prerequisite: MATH 2554. (Same as BIOL 4163)

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. Prerequisite: MATH 2603 or PHIL 2203. (Same as PHIL 4253)

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 2584.

MATH4443 Complex Variable for Application (Fa) Complex analysis, series, and conformal mapping. Additional applications for graduate credit. Prerequisite: MATH 2603 or MATH 2803, and MATH 2584.

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 2574.

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 or MATH 3093.

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.

MATH499V Research Topics in Mathematics (Irregular) (1-3) Current research interests in mathematics, at an advanced undergraduate or beginning graduate level. Prerequisite: Departmental consent. May be repeated for up to 12 hours of degree credit.

MATH5001 Connections to School Mathematics (Irregular) This course is a supplement to any graduate course in statistics, algebra, analysis, or geometry. The purpose is to connect the content of the graduate course to school mathematics. Prerequisite: Departmental consent. May be repeated for up to 6 hours of degree credit.

MATH5013 Abstract Algebra with Connections to School Mathematics (Irregular) Basic structures of abstract algebra (rings, fields, groups, modules and vector spaces) with emphasis on rings and fields as generalizations of the ring of integers and field of rational numbers. Degree credit will not be awarded for both MATH 4113 (or MATH 5123) plus MATH 5001 and for MATH 5013. Prerequisite: Graduate standing or departmental consent.

MATH5023 Geometry with Connections to School Mathematics (Odd years, Fa) School geometry from an advanced perspective including conformity to the Common Core State Standards for Mathematics. Study will include historical developments and geometry based on transformations of two- and three-dimensional space. Prerequisite: Graduate standing.

MATH5033 Advanced Calculus with Connections to School Mathematics Teaching (Irregular) Rigorous development of the real numbers, continuity, differentiation, and integration. Degree credit will not be awarded for both MATH 4513 (or MATH 5503) plus MATH 5001 and for MATH 5033. Prerequisite: Departmental consent.

MATH504V Special Topics for Teachers (Irregular) (1-6) Current topics in mathematics of interest to secondary school teachers. Prerequisite: Graduate standing or departmental consent. May be repeated for credit.

MATH5053 Probability & Statistics with Connections to School Mathematics (Sp) An advanced perspective of probability and statistics as contained in the high school mathematics curriculum with connections to other components of school mathematics. The content is guided by the content of the high school probability and statistics of the Common Core State Standards for Mathematics. Prerequisite: Graduate standing.

MATH507V Professional Development for Secondary Mathematics Teaching (Irregular) (1-3) Validated participation in professional development mathematics workshops or institutes sanctioned by national or international educational organizations such as the College Board, International Baccalaureate Program, and the National Board for Professional Teaching Standards. Prerequisite: Enrollment in Secondary Mathematics Teaching, MA degree program or departmental consent. May be repeated for up to 6 hours of degree credit.

MATH510V Mathematical Seminar (Sp, Fa) (1-3) Members of the faculty and advanced students meet for presentation and discussion of topics. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

MATH5123 Algebra I (Fa) What the beginning graduate student should know about algebra: groups, rings, fields, modules, algebras, categories, homological algebra, and Galois Theory. Prerequisite: MATH 3113, and graduate standing in mathematics or statistics, or departmental consent.

MATH5133 Algebra II (Sp) Continuation of 5123. Prerequisite: MATH 5123, and graduate standing in mathematics or statistics.

MATH5303 Ordinary Differential Equations (Fa) Existence, uniqueness, stability, qualitative behavior, and numerical solutions. Prerequisite: MATH 2584 and MATH 4513, and graduate standing in mathematics or statistics, or departmental consent.

MATH5313 Partial Differential Equations (Sp) Classification, boundary value problems, applications, and numerical solutions. Prerequisite: MATH 3423 and MATH 4513, and graduate standing in mathematics or statistics, or departmental consent.

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. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent. (Same as PHYS 5363)

MATH5453 Functional Analysis I (Odd years, Sp) Banach Spaces, Hilbert Spaces, operator theory, compact operators, dual spaces and adjoints, spectral theory, Hahn-Banach, open mapping and closed graph theorems, uniform boundedness principle, weak topologies. Prerequisite: MATH 5513, and graduate standing in mathematics or statistics, or departmental consent.

MATH5503 Theory of Functions of a Real Variable I (Fa) Real number system, Lebesgue measure, Lebesgue 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, and graduate standing in mathematics or statistics, or departmental consent.

MATH5513 Theory of Functions of a Real Variable II (Sp) Measure and integration on abstract measure spaces, signed measures, Hahn decomposition, Radon-Nikodym theorem, Lebesgue decomposition, measures on algebras and their extensions, product measures, and Fubini's theorem. Prerequisite: MATH 5503, and graduate standing in mathematics or statistics, or departmental consent.

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 Mobius 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, and graduate standing in mathematics or statistics, or departmental consent.

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, and graduate standing in mathematics or statistics, or departmental consent.

MATH5713 Algebraic Topology (Fa) Homotopy, singular and relative homology, excision theorem, the Mayer-Vietoris sequence, Betti numbers, and the Euler characteristic. Prerequisite: MATH 5703, and graduate standing in mathematics or statistics, or departmental consent.

MATH610V Directed Readings (Irregular) (1-6) Prerequisite: Departmental consent.

MATH619V Topics in Algebra (Sp, Su, Fa) (1-6) Current research interests in algebra. May be repeated for credit. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

MATH659V Topics in Analysis (Sp, Su, Fa) (1-6) Current research interests in analysis. May be repeated for credit. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

MATH679V Topics in Topology (Sp, Su, Fa) (1-6) Current research interest in topology. May be repeated for credit. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

MATH700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Doctoral candidacy in mathematics.

MECHANICAL ENGINEERING (MEEG)

James Leylek
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- Distinguished Professors Malshe, Saxena
- Professors Jong, Leylek, Nutter, West
- Associate Professors Couvillion, Roe, Tung, Spearot, Springer, Zou
- Assistant Professors Huang, Wejinya
- Instructors Davis, Roberts
- Adjunct Professors Cole, Dogan, Ramasubbu, Renfroe
- Adjunct Assistant Professors Batzer, Chaffin, Demydov, Hamilton, Holdsworth

Degrees Conferred:

M.S.M.E. (MEEG)
 M.S.E. (ENGR)
 Ph.D. in Engineering (ENGR) (See Engineering)

Areas of Study: Thermal systems, mechanical design, materials science, and engineering mechanics.

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; Machining, Advanced Tooling and Coatings; Thermal and Mechanical Design of Electronic Packages; Material Failure Analysis and Design of Experiments; Unsteady Aerodynamics; Computational Materials Science and Advanced Plasma Diagnostics.

Program Educational Objectives for the Master of Science Degree: The Program Educational Objectives of the M.S.M.E. degree in the Department of Mechanical Engineering are to produce graduates who:

1. Have a depth of knowledge in a particular field or subfield of mechanical engineering so that they are recognized as experts and/or innovators in that field;
2. Have a working knowledge of complementary areas of mechanical engineering and related fields, including other engineering disciplines, the sciences, and mathematics;
3. Have the ability to formulate a research plan;
4. Have the skills to execute a research plan and to generate and analyze original research results;
5. Are able to effectively communicate through oral presentations and written publications;
6. Are prepared for successful careers in industry, government and/or academia, and have the basic skills needed for life-long learning and professional development; and
7. Have an appreciation of scholarship, leadership, and service.

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 Graduate Coordinator.

Mechanical Engineering (MEEG)

MEEG4003 Intermediate Dynamics (Irregular) Review of central-force motion of spacecraft, use of rotating reference frames, Coriolis acceleration. Kinematics of rigid bodies in 3-D space: velocities and accelerations in different moving reference frames, addition theorem of angular accelerations. Kinetics of rigid bodies in 3-D space: eigenvalues and eigenvectors of inertia matrices, momentum and kinetic energy of a rigid body in 3-D motion, Euler's equations of motion; precession, nutation, and spin of a gyroscope; forced steady precession, torque free steady precession, space cone, and body cone. Prerequisite: MEEG 2013

MEEG4023 Composite Materials: Analysis and Design (Irregular) A study of fibrous composite materials with emphasis on mechanical behavior, synthesis, and application. Topics include macro- and micromechanical analysis lamina, lamina theory, failure analysis in design, and manufacturing techniques. Prerequisite: MEEG 3013.

MEEG4213 Control of Mechanical Systems (Irregular) 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 ELEG 4403)

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 3933.

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.

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.

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 understand-

ing 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 (Su, Fa) 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.

MEEG4503 Introduction to Flight (Fa) The course will provide understanding in basic aerodynamics, airfoil design and characteristics, and flight control surfaces. Prerequisite: MATH 2584, MEEG 3503.

MEEG4523 Astronautics (Irregular) Study of spacecraft design and operations. Prerequisite: MEEG 2013 and MEEG 2403 or consent of instructor.

MEEG4703 Mathematical Methods in Engineering (Irregular) Determinants, matrices, inverse of a matrix, simultaneous 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, Stokes' 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.

MEEG491V Special Projects (Sp, Su, Fa) (1-6) May be repeated for up to 6 hours of degree credit.

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 (Irregular) 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 (Irregular) 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 4104 and graduate standing.

MEEG5203 Robot Modeling and Simulation (Sp) This is a graduate level course in Robotics dealing with the behavioral study of robots. Topics covered in this course will include but not limited to the following: mathematical modeling of robots, rigid motions and homogeneous transformation, forward/inverse kinematics of robots, velocity kinematics, path and trajectory planning, robot dynamics, joint control, PD/PID control, and multivariable control. Advanced topics may include passivity-based motion control, geometric nonlinear control, computer vision, vision-based control, and sensor fusion. Prerequisite: Graduate standing in MEEG or ELEG and consent of the instructor.

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 microfabrication, surface and bulk micromachining, device packaging, device reliability, examples of micro sensors and actuators. Recitation three hours per week.

MEEG5273 Electronic Packaging (Irregular) 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 3933) and MATH 2584. (Same as ELEG 5273)

MEEG5303 Physical Metallurgy (Irregular) Physical and chemical properties of solids and the application of materials in commerce. Prerequisite: MEEG 2303.

MEEG5323 Physical and Chemical Vapor Deposition Processes (Irregular) 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.

MEEG5333 Introduction to Tribology (Irregular) A study of science and technology of interacting surfaces in relative motion. Topics include solid surface characterization, contact between solid surfaces, adhesion, friction, wear, lubrication, micro/nanotribology, friction and wear screening test methods, and tribological components and applications. Students may not earn credit for both MEEG 5333 and MEEG 4313. Prerequisite: Graduate standing.

MEEG5343 Computational Material Science (Irregular) This course provides students with an overview of different modeling techniques in material science. Applications will be presented on a broad range of modeling techniques including atomistic simulation methods, Monte Carlo techniques, molecular mechanics, and molecular dynamics. 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 (Irregular) 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.

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 2584.

MEEG5533 Fundamentals of Aerodynamics (Irregular) A study of external-flow fluid mechanics applied to Aerodynamics. Topics include integral and differential forms of the basic fluid equations (continuity, momentum, and energy), potential flow, and supersonic flow. Prerequisite: MEEG 3503 and MEEG 4503.

MEEG5733 Advanced Numerical Methods (Irregular) 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 Master's Research Topic and Report (Sp, Su, Fa) (1-3) Fundamental or applied research project required course for students electing the report option. Prerequisite: Graduate standing.

MEEG591V Special Problems (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

MEEG600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

MEEG6800 Graduate Seminar (Sp, Fa) A periodic seminar devoted to mechanical engineering research topics. Course includes letter grades A, B, C, D, and F as well as CR.

MEEG700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

MICROELECTRONICS – PHOTONICS (MEPH)

Ken Vickers

Program Chair

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Biological and Agricultural Engineering Faculty:

- Professor Li
- Associate Professors Kim, Ye
- Assistant Professor Jin

Chemical Engineering Faculty:

- Professors Beitle, Ulrich
- Associate Professor Roper
- Assistant Professor Hestekin (J.), Servoss

Chemistry Faculty:

- Professors Fritsch, Stenken
- Assistant Professors Chen, Tian

Civil Engineering Faculty:

- Professor Selvam

Computer Science/Computer Engineering Faculty:

- Assistant Professor Di

Electrical Engineering Faculty:

- Distinguished Professors Varadan (V.K), Varadan (V.V.)
- Professors Ang, Balda, Manasreh, Mantooth, Naseem
- Associate Professor El-Shenawee
- Assistant Professors Ji, Yu
- Research Professor Lostetter
- Research Associate Porter

Mechanical Engineering Faculty:

- Professor Malshe
- Associate Professors Tung, Zou
- Assistant Professors Huang, Spearot, Wejinya

Microelectronics-Photonics Faculty:

- Research Assistant Professor Benama
- Adjunct Professors (Fayetteville) DePriest, Foster
- Adjunct Professors (other locations) Beam, Cunningham, Dotsenko, Kaplan, Krasinki

Physics Faculty:

- Distinguished Professor Salamo
- Professors Bellaiche, Singh
- Research Professor Vickers
- Associate Professors Fu, Oliver
- Assistant Professors Barraza-Lopez, Li, Tchakhalian

Degrees Conferred:

M.S., Ph.D. in Microelectronics-Photonics (MEPH)

This multidisciplinary program prepares students for careers in the development and manufacturing of micro- to nanoscale materials, processing, and devices in such industries as biosensing, photonics, telecommunications, microelectronics, and MEMs. 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 typically 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 an introduction to electricity and magnetism or electronic circuits. 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 by 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 must meet the Graduate School's English Language proficiency test requirements for such GA positions.

Requirements for the Master of Science Degree: Students choosing this degree program will be assigned an initial adviser upon acceptance to the program. This adviser will be their Cohort Manager during that academic year. Students will work with the Director of the Microelectronics-Photonics

program to define their M.S. path to best support their career goals after graduation, with three curricula paths available to Microelectronics-Photonics students:

- **Non-thesis path:** Students who are funded by personal resources or by graduate assistantships not associated with research or educational grants may complete an M.S. degree with additional course work in place of independent research. While there may be specific narrow career options where this is an appropriate path, the Microelectronics-Photonics program strongly recommends the Professional or Academic paths as providing a much better overall career preparation for working in a technical position. Students completing this path cannot be accepted for the Ph.D. Microelectronics-Photonics program.
- **Professional path:** Students who plan to enter the technical marketplace after M.S. completion will find this path most beneficial as it requires independent graduate-level research in collaboration with an external technical organization. The research may be in the form of a traditional M.S. six-hour research topic and thesis, or may instead be in the form of two three-hour independent research efforts resulting in written reports with the clarity, style, analysis, and conclusions expected of a journal paper submission. Both the thesis and the written reports will be orally defended before the appropriate student committee. Students in this path will also be required to complete at least one internship of at least six weeks duration to experience a non-academic technical environment. Students completing this path may be considered by the GSCMEP for admission to the Ph.D. Microelectronics-Photonics program based on the strength of their academic course grades, their independent research depth, and the quality of the written research document.
- **Academic path:** Students who plan to complete an academic campus-based research thesis will take this path, although the research topic may include funding and collaboration with outside technical organizations. Students who complete all requirements for M.S. graduation, including an independent research project and thesis acceptable to their thesis committee, will be eligible without GSCMEP review for admission to the Ph.D. Microelectronics-Photonics program.

Students will form either a theses committee or and advisory committee after they have chosen their M.S. path, defined any independent research areas, and been accepted into a research group if appropriate. A thesis 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). The advisory committee will include at least one GSCMEP member, the supervising faculty member for a research experience, and the student's cohort leader. If the student is in the Professional path, then either committee must also include at least one technical professional from the partner external organization as an adjunct faculty member or an *ex officio* committee member.

Students in this degree program can choose an Academic path, a Professional path, or a Non-thesis path. The course hours to meet the minimum requirements for each paths are as follows:

	Academic Path	Professional Path	Non-Thesis Path
Subject Area	Hours	Hours	Hours
Science	6	6	6
Engineering	9	9	12

MEPH 5383 Research Commercialization	3	3	3
MEPH 5811/5911/ 6811/ 6911 Open Seminar	>=3	4	>=3
MEPH 5821 Ethics	In Ph.D. Curriculum	1	Recommended
MEPH 5832 Proposal Writing and Management	In Ph.D. Curriculum	Recommended	Recommended
Technical elective	6	6	15
DEPT 600V Research Thesis	6	(option) 6	0
MEPH 5513 Applied External Research	Not available	(or option) 3 + 3	Not available
MEPH 5523 Applied Internal Research	Not available	(or option) 3 + 3	Not available
MEPH 588V Independent Project	Not available	Not available	(<=3 as technical elective)
MEPH 555V External Technical Internship	Recommended in Ph.D. studies	1 <=V <=3	Not available
Total	33	35-38	39

If a University of Arkansas undergraduate student is pursuing a Bachelor of Science degree in a department that has implemented an accelerated B.S./M.S. program (typically allowing six hours of graduate-level course work to be shared between the two degrees), the student may implement the same acceleration for a B.S. departmental degree/M.S. Microelectronics-Photonics degree set. Both the undergraduate department and the Microelectronics-Photonics program Director must approve the shared courses prior to enrollment.

Each student's curriculum must also address a need for a focus field. Each student completing a Microelectronics-Photonics degree must define a curriculum containing the following core requirements in the focus field to cover five aspects of micro- to nanoscale materials and devices. In the Applications aspect, every student must complete ELEG 4203 Semiconductor Devices. In the Materials aspect, students must take at least one course emphasizing the nature of the materials applied in their chosen focus field. In the Fabrication aspect, students must take at least one course emphasizing the theory of micro- or nanoscale fabrication in their focus field. In the Fabrication Practice aspect, all students are highly encouraged to complete at least one course containing hands-on laboratory fabrication experience. In the Management of Technology aspect, every student must complete MEPH 5383 Research Commercialization and Product Development.

The Graduate Handbook of the Microelectronics-Photonics Graduate Program will contain a current list of approved courses in each of these areas that will allow students to optimize their curriculum within their focus field. Students may choose a course not listed in the handbook to fill an aspect's required course with the permission of their thesis committee and the Microelectronics-Photonics Director. Students who have acquired the knowledge contained in these courses through prior education may petition the Microelectronics-Photonics program Director for permission to substitute other classes for these core courses.

Additional core courses to develop operations management skills also have been defined for Microelectronics-Photonics students. During year one of their graduate studies at the University of Arkansas, students are required to take MEPH 5811 Infrastructure Management and MEPH 5911 Personnel Management and Leadership in the 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 and MEPH 6911 Operations Management Seminars in both fall and spring semesters and MEPH 5832 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 to five of these seven credit hours may be used in M.S. curricula, shown in the table, and the remaining credit hours may be applied as Ph.D.-level technical electives.

Students are required to attend monthly Microelectronics-Photonics Research Communication Seminars during the first three semesters of their M.S. degree program, and will enroll in MEPH 5611 Research Communication Seminar of MS Students in their third semester.

Research thesis hours will be chosen from the department of the student's research adviser (e.g., PHYS 600V, ELEG 600V, etc.) and will require a written thesis successfully defended in a comprehensive oral exam given by the thesis committee.

A research thesis is required for Academic path students, and is optional for Professional path students. Professional path thesis research must include direct collaboration with an external technical organization.

A student in the Professional path may substitute two Applied Research efforts for a thesis under MEPH 5513 (External location) or MEPH 5523 (Internal on-campus location), provided each semester's research is of graduate-level quality and is reported at the end of the semester through a written paper and in an oral presentation to the advisory committee (note that the written paper must match the clarity, style, analysis, and conclusions expected of a journal paper submission). Regardless of where the research is performed, it must include direct collaboration with an external technical organization.

Independent project hours in support of the Non-thesis path may be either MEPH 588V Special Problems in Microelectronics-Photonics or a departmental Special Problems course number, and will require a written project report modeled after a professional journal submission that is then defended in a comprehensive oral exam given by the advisory committee.

Each student is required to enroll in at least one hour of course work each fall and spring semester until the M.S. degree is issued. If all required course work has been completed, the student may enroll in one hour of master's thesis, or in one hour of a special problems course for credit only.

Requirements for the Doctor of Philosophy Degree: Students choosing this degree program will be assigned an initial adviser upon acceptance to the program. This adviser will be their Cohort manager during that academic year. Students will work with the Director of the Microelectronics-Photonics 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 curriculum of the Master of Science in Microelectronics-Photonics at the University of Arkansas. This core is described in detail above and in the handbook of the Microelectronics-Photonics program and is the knowledge 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 written 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 written Ph.D. candidacy exam within four

semesters after M.S. graduation.

A second part of the candidacy exam, a detailed Ph.D. research proposal, must be presented to the student's committee prior to substantive work being performed in the research area. This research proposal is not linked to the written candidacy exam and may be presented to the committee when appropriate.

Students who fail to pass their written 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 identified by the exam. The student will be allowed to retake the written exam only one additional time, which must be during the next scheduled written 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 27 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) no more than four hours of MEPH 5811, 5911, 6811, 5821, and 5831.

Students are required to attend monthly Microelectronics-Photonics Research Communication Seminars during the first five semesters of their Ph.D. degree program, and will enroll in MEPH 6611 Research Communication Seminar of PhD Students in their fifth semester.

In addition to these conditions, the 21 hours of research dissertation 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. The dissertation format must meet all Graduate School published guidelines and the Microelectronics-Photonics guidelines as listed in the Microelectronics-Photonics Graduate Student Handbook. A Ph.D. candidate wishing to use a compilation of published papers for the dissertation must receive explicit permission from the GSCMEP to use this style dissertation at least six months prior to his or her dissertation defense, with a meeting between the student's committee chair and the GSCMEP required before permission can be granted.

Microelectronics-Photonics (MEPH)

MEPH5383 Research Commercialization and Product Development (Sp) This survey course examines research commercialization through analysis of IP, technology space, market space, manufacturability, financials, and business plans. Entrepreneurial behaviors and product development within large companies are also discussed. A case study using a current UA faculty member's research commercialization effort will be developed. Prerequisite: Graduate Standing.

MEPH5513 Applied Research in External Technical Organizations (Sp, Su, Fa) A one semester narrow focus graduate level research effort while working at an external technical organization's site. Requires a final report of style and quality suitable for journal submission. This course available only to Professional Path M.S. microEP students, and may substitute for an MEPH 588V External Internship. May be repeated for up to 6 hours of degree credit.

MEPH5523 Applied On-Campus Collaborative Research with External Technical Organizations (Sp, Su, Fa) A one semester narrow focus graduate level on-campus research effort performed in collaboration with an external technical organization. Requires a final report of style and quality suitable for journal submission. This course available only to Professional Path M.S. microEP students. May be repeated for up to 6 hours of degree credit.

MEPH555V Internship in External Technical Organization (Sp, Su, Fa) (1-3) Used to document a microEP grad student internship experience in an external technical organization for a minimum duration of six weeks (6-9 weeks=one hour, 10-12 weeks=two hours, and 13-15 weeks=three hours). It may not be used to meet the research requirements of a M.S. degree. Prerequisite: Graduate standing.

MEPH5611 Research Communication Seminar of MS Students (Sp, Fa) This course serves as a forum for MS students to develop oral presentation skills and to exchange research ideas. Research presentations will be on various topics in the area of micro to nanoscale materials, processing, and devices, with research management and planning also being addressed. Prerequisite: Graduate standing.

MEPH5713 Advanced Nanomaterials Chemistry (Irregular) Science and engineering graduates are using more nanomaterials, and modern industry demands that its scientists and engineers have materials chemistry knowledge. Materials from the micro to nanoscale will be examined in this course from the perspective of fundamental chemistry principles to build a picture of tomorrow's materials. May be repeated for up to 3 hours of degree credit.

MEPH5733L Fabrication at the Nanoscale (Sp) This hands-on lab course will cover the disciplines needed to make active electronic and photonic devices utilizing nanoscale structures and fabrication techniques presently used in research and industry. Prerequisite: Graduate standing and permission of the instructor.

MEPH5742 Transmission Electron Microscopy Theory and Operation (Irregular) This new laboratory course will introduce students to practical electron microscopy and to the operation of the Titan S/TEM for examination of sub-angstrom examination of materials. Students will learn how to conduct a TEM study, how to operate the TEM, and how to extract and interpret useful information. Prerequisite: Graduate standing.

MEPH5811 1st Year Operations Seminar - Infrastructure Management (Fa) Weekly seminar for 1st year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect organizational infrastructure, career planning, organizational structures, and may include examples from current events. Prerequisite: Graduate standing.

MEPH5821 Ethics for Scientists 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.

MEPH5832 Proposal Writing and Management (Su) This course introduces factors that affect proposal success in both the academic and industrial arenas; demonstrates different approaches to writing successful proposals; and introduces students to the legal responsibilities and ramifications of proposal management. Students will write two proposals for peer review and formal evaluation. Prerequisite: Graduate standing.

MEPH587V Special Topics in Microelectronics-Photonics (Irregular) (1-4) Consideration of current microelectronic-photonic topics not covered in other courses. One section will be created for each topic only after a syllabus is submitted to the microEP office by the faculty member teaching the course. May be repeated for up to 9 hours of degree credit.

MEPH588V Special Problems in Microelectronics-Photonics (Irregular) (1-3) Opportunity for individual study of advanced subjects related to a graduate degree in Microelectronics-Photonics to suit individual requirements. One section will be created for each student only after a syllabus is submitted to the microEP office by the supervising faculty member. May be repeated for up to 6 hours of degree credit.

MEPH5911 1st Year Operations Seminar - Personnel Management (Sp) Weekly seminar for 1st year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect personnel management, team building and structures, and may include examples from current events. Prerequisite: Graduate standing.

MEPH599T MEPH TRANSFER COURSE

MEPH6023 Law and Public Policy (Fa) 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. Pre- or corequisite: PUBP 6012.

MEPH6103 Policy Leadership Seminar (Irregular) 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 interagency settings.

MEPH6113 Agenda Setting and Policy Formulation (Irregular) 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.

MEPH6611 Research Communication Seminar of PhD Students (Sp, Fa) This course serves as a forum for Ph.D. students to develop oral presentation skills and to exchange research ideas. Research presentations will be on various topics in the area of micro to nanoscale materials, processing and devices, with research management and planning also being addressed. Prerequisite: Graduate standing.

MEPH6811 2nd Year Operations Seminar - Management and Leadership (Fa) Weekly seminar for 2nd year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect management and leadership effectiveness and efficiency, and may include examples from current events. Prerequisite: Graduate standing.

MEPH6911 2nd Year Operations Seminar - Advanced Management and Leadership (Sp) Weekly seminar for 2nd year Microelectronics-Photonics graduate students to discuss advanced issues that increase professional performance in technology-centered organizations. The discussions will focus on the complex issues that affect management and leadership effectiveness and efficiency, and may include examples from current events. Prerequisite: Graduate standing.

MIDDLE-LEVEL EDUCATION

See the listing in the Department of Curriculum and Instruction, page 90.

MUSIC (MUSC)

Ronda Mains
 Department Chair
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 479-575-4701
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 210 Music Building
 479-575-4701
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- Professors Cencel, Gates, Greeson, Mains, Margulis (J.), Mueller, Ragsdale, Ramey, Sloan, Thompson, Warren
- Associate Professors Cholhitchanta, Jones, Knighton (C.), Margulis (E.), Misenhelter, Pierce, Rulli, Yoes
- Assistant Professors Kahng, Nedball, Prickett
- Visiting Assistant Professors Chamberlain, Knighten (J.), Lacy
- Instructors Delaplain, Morris
- Lecturers Runkles, Salonen

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, Ethnomusicology, 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, ethnomusicology, 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, Ethnomusicology, and Music Theory	12	II. Music History, Ethnomusicology, and Literature	6
1) MUHS 5973 Seminar in Bibliography and Methods of Research		1) MUHS 5973 Seminar in Bibliography and Methods of Research	
2) Three or more hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser		2) Three or more hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser	
3) One music theory course to be selected from MUTH 477V (3), 5623, 5343, 5643		III. Electives	9
4) Electives totaling 3 hours in either music history, ethnomusicology, and/or music theory to be selected from (2) or (3) above or MUHS 4253 or 4963H		Graduate-level courses to be selected from MUAP, MUEN (4 credit maximum), MUHS, MUSY, MUTH, or MUPD areas or other disciplines with consent of the major adviser.	
III. Electives	8	E. Master of Music in Music Theory:	36
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.		I. Music Theory and Composition	21
C. Master of Music in Performance, Voice:	36	1) MUTH 5623 Pedagogy of Theory	
I. Applied Music	18	2) MUTH 5643 Analysis of 20th Century Music	
Requirements include:		3) MUTH 600V Master's Thesis (6)	
1) MUAP 510V for four semesters, total 14 hours, to include:		4) Courses to be selected from MUTH courses at the 4000- or 5000-level (9 hours minimum).	
a) Preparation of one complete operatic or oratorio role		II. Music History, Ethnomusicology, and Literature	6
b) Demonstration of language proficiency in English and three foreign languages		1) MUHS 5973 Seminar in Bibliography and Methods of Research	
2) MUAP 5201 (solo recital)		2) Three or more hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser	
3) MUAP 5211 (chamber or solo recital)		III. Electives	9
4) MUEN 5401 (two semesters) Opera Theater		Graduate-level courses to be selected from MUAP, MUEN (4 credit maximum), MUHS, MUSY, MUTH, or MUPD areas or other disciplines with consent of the major adviser.	
II. Music History, Ethnomusicology, and Music Theory	12	F. Master of Music in Music History: (Music history, early music performance practice.)	36
1) MUHS 5973 Seminar in Bibliography and Methods of Research		I. Music History and Literature	20
2) Three or more hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser		1) MUHS 5973 Seminar in Bibliography and Methods of Research	
3) One music theory course to be selected from MUTH 477V (3), 5623, 5343, 5643		2) At least three courses from the 5000-level music history and musicology seminars (MUHS 5753, 5773, 5783, 5793, 5903)	
4) Electives totaling 3 hours in either music history, ethnomusicology, and/or music theory to be selected from (2) or (3) above of MUHS 4253 or 4963H		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.	
III. ELECTIVES	6	4) MUHS 600V Master's Thesis (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		II. Applied Music	4-8
Note: Study of vocal literature is required if not adequately covered in the undergraduate degree presented for admission but will count toward the degree as an elective.		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	
D. Master of Music in Composition:	36	III. Music Theory and Composition	4-8
I. Music Theory and Composition	21	Courses to be selected with the approval of the major adviser.	
1) MUTH 5643 Analysis of 20th Century Music	6	IV. Electives	
2) MUTH 568V Composition	6	Courses either within the music department or in related fields, subject to the approval of the major adviser.	
3) MUTH 600V Master's Thesis	6	G. Master of Music in Instrumental Conducting	36
4) Electives in music theory	66	I. Music Theory and Composition	7
		1) MUTH 4703 Writing Music Analysis	
		2) MUTH 4612 or MUTH 5672 Orchestration	
		3) MUTH 4322 Score Reading	

II. Music History, Ethnomusicology, and Literature	11-12
1) MUHS 5973 Seminar in Bibliography and Methods of Research	
2) Three or four hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser	
3) At least one course in the area of music literature, 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 or MUSY 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 Writing Music Analysis	
2) MUTH 4612 or MUTH 5672 Orchestration	
3) MUTH 4322 Score Reading	
II. Music History, Ethnomusicology, and Literature	11-12
1) MUHS 5973 Seminar in Bibliography and Methods of Research	
2) Three or four hours of 5000-level MUHS or MUSY courses selected in consultation with the student's major adviser	
3) MUHS 5952, 5962	
4) Other courses to be selected from 5000-level MUHS or MUSY 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 4733	
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 adviser. Possible areas of study include composition, conducting, chamber music, music theory, and music history.

Piano, voice, viola, violin, violoncello, string bass, clarinet, bassoon, flute, oboe, alto saxophone, French horn, trombone, baritone, tuba, trumpet, percussion.

Applied Music (Class) (MUAC)

MUAC4371 Teaching the High School Percussionist (Irregular) 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 instruments. Includes study of high school band, orchestra and percussion 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 credit.
MUAP510V Applied Voice/Instrument (Sp, Su, Fa) (1-5) Private study at the graduate level. Prerequisite: MUAP 310 or equivalent. May be repeated for credit.
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 credit.
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 credit.

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.
MUED5513 Seminar: Resources in Music Education (Irregular) 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 (Irregular) 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 (Irregular) Concepts of elementary music education; methods, materials, curriculum design, and supervision in elementary school music.
MUED5811 Curriculum Design in Music (Irregular) 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 (Irregular) (1-18) An in-service training workshop for elementary music teachers.
MUED5862 Marching Band Techniques (Irregular) Includes the place of the marching band in the school program, types of formations used, and selecting, arranging or writing the musical score.
MUED5973 Tests and Measurement in Music (Irregular) 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 (Irregular) 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.
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 (Irregular) (1-6) Provides students with an opportunity to pursue special study of problems in music education. May be repeated for up to 6 hours of degree credit.

Music Ensemble (MUEN)

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 credit.
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 credit.
MUEN5421 Inspirational Chorale (Sp, Fa) Performance of African-American literature with particular emphasis on Negro spirituals, traditional/contemporary gospel music and sacred world music. Rehearsal 3 hours per week. Admission with director's approval May be repeated for up to 2 hours of degree credit.
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 credit.
MUEN5441 Marching Band (Fa) Rehearsal 8 hours per week. Admission with director's approval. May be repeated for credit.
MUEN5451 Schola Cantorum (Sp, Fa) Vocal ensemble limited to the more experienced sing-

ers. Rehearsal 5 hours per week. Admission with director's approval. May be repeated for credit.
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 credit.
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 credit.
MUEN5481 Campus Band (Sp) Rehearsal 3 hours per week. Admission by audition and approval of the conductor. May be repeated for credit.
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 credit.
MUEN5511 Symphonic Band (Sp) Rehearsal 3 hours per week. Admission by audition and approval of the conductor. May be repeated for credit.
MUEN5521 Woodwind Quintet (Sp, Fa) Study and performance of music for woodwind quintet. Weekly coaching will emphasize intonation, blend, stylistic awareness, and ensemble precision. Repertoire ranges from the 18th to the 20th centuries. 3 hours of rehearsals weekly. May be repeated for credit.
MUEN5541 Accompanying (Sp, Fa) Piano accompanying of vocal and instrumental soloists. Rehearsal 2 hours per week. Prerequisite: MUAP 110. May be repeated for credit.
MUEN5551 Percussion Ensemble (Sp, Su) Study and performance of ensemble music for multiple percussion instruments. Rehearsal 2 hours per week. May be repeated for credit.
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 credit.
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 credit.
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 credit.
MUEN5771 Trombone Ensemble (Irregular) Study and performance of music for multiple trombones, including trios, quartets, quintets, and trombone choir. Rehearsal 2 hours per week. May be repeated for credit.
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 credit.

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 credit.
MUHS4703 Survey of String Literature (Irregular) A survey of solo and chamber music literature involving stringed instruments. Prerequisite: MUAP 110 and MUTH 3613.
MUHS4733 Survey of Symphonic Literature (Even years, Sp) A survey of the symphonic literature from its beginning to the present.
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 (Irregular) 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, Fa) A survey of the piano works of outstanding composers. Prerequisite: MUAP 110V.
MUHS4813 Survey of Keyboard Literature II (Irregular) A survey of the piano works of outstanding composers. Prerequisite: MUHS 4803.
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.
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 (Irregular) 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 (Irregular) Current problems, techniques, and approaches to the practice of musicology, including notation and editing problems. May be repeated for credit.
MUHS5943 Seminar in Opera (Irregular) Intensive studies in operatic literature.
MUHS5952 Choral History and Literature I (Irregular) Detailed study of choral history and literature from Gregorian chant to J.S. Bach.
MUHS5962 Choral History and Literature II (Irregular) Detailed study of choral history and literature from J.S. Bach to the present.
MUHS5973 Seminar in Bibliography and Methods of Research (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)

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.

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 (Irregular) 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 up to 18 hours of degree credit.

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.

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.

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 up to 6 hours of degree credit.

Ethnomusicology (MUSY)

MUSY5113 Proseminar: Ethnomusicology (Irregular) An introduction to ethnomusicological study, with readings and discussion of seminal writings in the field and practical experience in ethnomusicological analysis and description. (Same as MUSY 4113) May be repeated for up to 6 hours of degree credit.

MUSY5313 Proseminar: Topics in Asian and Middle Eastern Musics (Irregular) Research seminars on selected topics, such as The Performing Arts in East Asia; and Music and Ritual. May be repeated for up to 6 hours of degree credit.

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 for up to 6 hours of degree credit.

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.

MUSY5413 Proseminar: Cross-cultural Performance Practices (Irregular) 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.

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).

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 (Sp) 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 3613.

MUTH4703 Writing Music Analysis (Sp) Analysis of music with an emphasis on analytical writing skills and the use of library source materials.

MUTH477V Special Topics in Music Theory (Irregular) (1-4) Subject matter not covered in other courses. May be repeated for up to 4 hours of degree credit.

MUTH5343 Analytical Techniques (Irregular) 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 3613 or equivalent and graduate standing.

MUTH5623 Pedagogy of Theory (Irregular) Detailed study of methods of teaching undergraduate courses in music theory and aural perception. Prerequisite: Graduate standing.

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 (Irregular) 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. Prerequisite: Graduate standing. May be repeated for credit.

MUTH599V Independent Study in Music Theory (Irregular) (1-6) Provides students with an opportunity to pursue special study of topics in music theory. May be repeated for up to 12 hours of degree credit.

MUTH600V Master's Thesis (Sp, Su, Fa) (1-6)

NURSING, ELEANOR MANN SCHOOL OF (NURS)

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- Professors Kippenbrock, Neighbors
- Associate Professors Barta, Smith-Blair
- Assistant Professors Emory, Jarrett, Lee, Odell, Osborne
- Instructors Agana, Lee, Malm, Miller, Sharp-McHenry, Sisson

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 online 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 and as Nurse Educators. 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 evidence-based practice 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 patients 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 and health policy; the complex needs of diverse populations; and for the CNS students, preparation in the role of the Advanced Practice Nurse. The Nurse Educator Core and specialty development courses prepare Nurse Educator students to assume roles in various educational settings. The Advanced Practice Core provides CNS students with the advanced knowledge and skills for a comprehensive approach to the management of client problems. The Clinical Nurse Specialist Core provides CNS students with the experience and guidance in advanced clinical decision making to ensure quality care for diverse populations. The Thesis or Research Project allows CNS students to contribute to new knowledge in nursing through original research, replication stud-

ies, dissemination efforts, and utilization projects. The thesis or scholarly project requirement also prepares graduates for further study in a doctoral program. 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 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 roles of clinician, teacher, manager, researcher, and consultant.
5. Utilize theories from nursing and other disciplines for decision making.
6. Advocate for access to quality health care for diverse populations.
7. Collaborate with other disciplines to design, deliver, and evaluate health care services for diverse populations.
8. Provide leadership in education in a variety of clinical and academic settings.

Areas of Concentration: Clinical nurse specialist; nursing educator.

Primary Areas of Faculty Research: Cardiopulmonary physiology; placement, recruitment and retention of advanced practice nurses; attrition and retention of nursing students; nurse educator leadership; professional development; and older adults and dementia; domestic and international perinatal epidemiology; evidence-based practice; and health policy.

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 unencumbered licensure to practice as a registered nurse. 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, current required immunizations 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.

Following admission to the program, students will undergo a criminal background check and drug screening.

Requirements for the Master of Science in Nursing Degree, Clinical Nurse Specialist Concentration: 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, 5043, 5053, 5063; Advanced Practice Core courses: NURS 5033, 5143, 5102, 5111, 5123; Clinical Specialist Core courses: NURS 5212, 5225, 5232, 5245. Students complete a total of 500 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 scholarly 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.

Requirements for the Master of Science in Nursing Degree, Nurse Educator Concentration: In addition to the general requirements of the Graduate School, students must complete a minimum of 39 credits (42 credits with thesis option) including the following courses: Graduate Nursing Core courses: NURS 5003, 5043, 5053, 5063; Advanced Practice Core courses: NURS 5143, 5102, 5111, 5123; Nursing Education Core courses: NURS

5303, 5313, and 5323; Specialization courses: NURS 5343 and 5353. As an alternative to completing a thesis, students may elect the scholarly 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.

Nursing (NURS)

NURS481V Special Topics in Nursing (Irregular) (1-6) This course is the study of a special topic(s) in nursing. Content varies. May be repeated for up to 6 hours of degree credit.

NURS5003 Theoretical Foundations in Nursing (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.

NURS5033 Role Development of the Advanced Practice Clinical Nurse Specialist (Fa) 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.

NURS5043 Advanced Concepts in Health Promotion with Diverse Populations (Fa) Provides a theoretical base 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. Provides opportunity to develop, implement, and evaluate health promotion interventions for selected clients.

NURS5053 Evidence-Based Practice and Innovation in Nursing (Sp) This course focuses on developing evidence-based practice and innovation in nursing. Models and strategies for leadership in evidence-based practice and innovation, outcomes management, and translational scholarship will be examined.

NURS5063 Health Care Policy (Su) The course provides the concepts of the political process, health care policy, advocacy, leadership skills, legislative and regulatory issues, health care financing, designing and implementing health care policies and evaluating outcomes. Access, cost, and quality of health care will be a major focus of the course. Prerequisite: Admission to the graduate program or by permission of the instructor.

NURS5102 Advanced Health Assessment (Sp) 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 Assessment (Sp) Clinical practicum companion course for NURS 5102: Advanced Health Assessment. Opportunities to conduct health assessments on a variety of clients. Corequisite: NURS 5102.

NURS5123 Advanced Pharmacology (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.

NURS5143 Advanced Pathophysiology (Sp) 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 (Fa) 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 (Fa) 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 (Sp) 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 (Sp) 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 (Fa) Considers the principles, philosophies, theories, and strategies of teaching, learning, and evaluation needed in nursing education.

NURS5313 Curriculum and Evaluation in Nursing Education (Su) Considers knowledge and skills needed for curriculum and program development and evaluation for a variety of nursing education settings.

NURS5323 Teaching in Nursing Practicum (Fa) Supervised experience in the nurse educator role in both classroom and clinical settings.

NURS5343 Independent Study: Specialty Development I (Sp) This course will include two foci. There will be readings focused on current topics in a specialty area. A focused field experience will allow student to integrate knowledge and skills in a specialty area of nursing in preparation for the nurse educator role.

NURS5353 Independent Study: Specialty Development II (Fa) Building on the Independent Study: Specialty Development I, this course will include two foci. There will be readings focused on current topics in a specialty area. A focused field experience will allow student to integrate knowledge and skills in a specialty area of nursing in preparation for the nurse educator role. Prerequisite: NURS 5343.

NURS579V Independent Study (Sp, Su, Fa) (1-3) Independent study designed by student with faculty advisor. May be completed as alternative to thesis.

NURS599V Seminar (Irregular) (1-3) Selected topics in nursing explored in discussion format.

NURS600V Master's Thesis (Sp, Su, 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

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- Distinguished Professor White
- Professors Cassidy, Loewer, Rossetti
- Associate Professor Pohl (E.)
- Visiting Professor Long
- Visiting Assistant Professors Adler, Bean, Belcher, Brown, Burgin, Casey, Cash, Collier, Costello, DelCastillo, Donatelli, Ellixson, Eveleth, Flynn, Gagnon, Garner, Hemphill, Henderson, Jackson, Jones (P), Jones (T), Lasareff-Mironoff, Lattanzi, Lithgow, Magri, Masterson, Mellenthin, Mickelson, Moores, Morris (A.), Morris (J.), Nethercutt, Paulson, Payne, Perrin, Pohl (L.), Rasmussen, Raynor, Richardson, Rieske, Rister, Robinson, Roy, Sample, Sandsmark, Sloan, Teague, Ward, Wells, Wilke, Wilson, Wright, Yeager, Zilinsky

Degree Conferred:

M.S.O.M. (OPMG)

The Master of Science program in Operations Management is directed toward the acquisition of practical knowledge in the management of work processes, projects, and people. Areas covered include project management, quality management, economic decision-making, supply chain management, operations research, safety management, lean production and inventory control techniques, and human behavior analysis.

The operations management program is conducted at Graduate Residence Centers in Arkansas, Tennessee, and Florida, as well as at Fayetteville. Evening classes are offered in eight-week terms with five terms scheduled during an academic year. Selected courses are available via Internet and independent study. The operations management curriculum is aimed at the needs of working managers of technical and logistics operations, as well as managers of production, service delivery and support functions in a wide spectrum of organizations, ranging from business/industry to military, government and non-profit. The program is open to students regardless of the major they selected as an undergraduate. The subject matter is patterned after the industrial engineering curriculum but is less technical and does not require a calculus mathematics background.

Admission to the program generally follows U of A Graduate School admission policies with the following exceptions:

1. The program does not permit the use of the MAT as an entrance test to compensate for undergraduate GPAs below 3.0. The GRE and GMAT are acceptable tests, but the analytical writing score must be 3.5 or above;
2. All applicants, including those with advanced degrees, will be evaluated for admission on the basis of their first baccalaureate degree.
3. Before taking any graduate classes in the program, non-native speakers of English who do not have a conferred undergraduate degree from an accredited U.S. college or university must

demonstrate minimum proficiency on one of the following tests of written English: TOEFL, IBT (23), ELPT (70) or GRE/GMAT (3.5).

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 these subject areas):

- OMGT 4313 Law and Ethics
- OMGT 4323 Industrial Cost Analysis
- OMGT 4333 Applied Statistics

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. Of these hours, 12 hours consist of required courses, while the remaining 18 hours are electives.

Required courses are:

- OMGT 5003 Introduction to Operations Management
- OMGT 4783 Project Management for Operations Managers
- OMGT 4623 Strategic Management or
- OMGT 5873 Organization and Control
- OMGT 5123 Finance for Operations Managers or
- OMGT 5463 Economic Decision Making

If a core course requirement offers a choice between two options, only one can be counted as the required course. Required courses must be taken in the first 18 hours of graduate coursework and be completed with a grade of "B" or better. Students who earn a "C" in a required course may repeat the course only once. Failure to earn a "B" or better in any of the four required courses will result in dismissal from the program.

While a thesis is not required, 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)

OMGT4303 Industrial Safety and Health Administration (Irregular) Based on Federal Regulations for Occupational Safety and Health, the course examines current regulations, as well as their commonsense application. Covers various standards, such as those for material handling, personal protective equipment, toxic substances, and machine guarding. Uses case studies and real world scenarios to present topics and demonstrate their application.

OMGT4613 Lean Production and Inventory Control (Irregular) Defines analytical methods used to support inventory replenishment for the production of goods and services. Operational problems of production systems are examined, including objective/subjective forecasting methods, aggregate planning of work force and production under seasonal demand; and inventory models of EOQ for known and unknown demand. Supply chain management and lean manufacturing concepts are also discussed. Prerequisite: OMT 4333 and OMT 5003.

OMGT4623 Strategic Management (Irregular) Examines strategic management, which is defined as the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its long-term objectives. Principles of strategic management will be covered in conjunction with case studies to provide opportunity for analysis and experience in applying these principles in an operations management environment. Required course (may be substituted by OMT 5873).

OMGT4783 Project Management for Operations Managers (Irregular) An introduction to the Critical Path Method and Program Evaluation and Review Technique. Covers project planning and control methods; activity sequencing; time-cost trade-offs; allocation of manpower and equipment resources; scheduling activities and computer systems for PERT/CPM with emphasis on MS project. Case studies include topical issues combining methodologies and project management soft skills, such as conflict management, negotiation, presentations to stakeholders, and team building. Required course.

OMGT4873 Principles of Operations Research (Irregular) Surveys the mathematical models used to design and analyze operational systems. Includes linear programming models, waiting line models, computer simulation models, and management science. Students will be introduced to applications of operations research and solution methods, using spreadsheet software. Prerequisite: OMT 4333.

OMGT5003 Introduction to Operations Management (Sp, Su, Fa) Provides an overview of the functional activities necessary for the creation/delivery of goods and services. Topics covered include: productivity; strategy in a global business environment; project management; quality management; location and layout strategies; human resources management; supply chain and inventory management; material requirements planning; JIT; maintenance and reliability; and other subjects relevant to the field. Required course.

OMGT5013 Supply Chain Management for Operations Managers (Irregular) Focuses on the development and application of decision models in supply chains with emphasis on supply chain performance, cost, and metrics; demand forecasting; aggregate planning; inventory management; supply chain design and distribution; transportation modeling and analysis; supply chain coordination; the role of information technology; and sourcing decisions. Spreadsheet tools and techniques will be used to analyze supply chain performance. Prerequisite: OMT 4333 and OMT 5003.

OMGT5113 Human Resource Management (Irregular) A review of Human Resources Management functions as they apply in today's business setting with specific emphasis on regulatory compliance, total rewards systems, recruitment, training, and employment practices. The course is designed both for HRM professionals and for line managers/professionals who need to understand the roles and responsibilities of HR as a business partner.

OMGT5123 Finance for Operations Managers (Irregular) Examines the scope and environment of finance for operations managers. Topics include financial markets, interest rates, financial statements, cash flows, and performance evaluation. Valuation of financial assets, using time value of money; the meaning and measurement of risk/return; capital-budgeting, cost of capital, capital structure, dividend policy, and working capital management are also covered. Required course (may substitute OMT 5463). Prerequisite: OMT 4323.

OMGT5133 Operations Management in 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 Strategic Issues in Human Resource Management (Irregular) Explores the concept of Strategic Human Resource Management with emphasis on effective partnering by various HR functions with all levels of management to support the large-scale, long-range goals of achieving success in the organization's chosen markets. Internal and external impacts on and of HR in all areas will be examined. Students will analyze case studies to build on basic concepts acquired in OMT 5113. Prerequisite: OMT 5113 or consent.

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 air containment PEL concentrations and industrial environment noise levels are examined. Prerequisite: INEG 4223 or OMT 4303.

OMGT5303 Health Care Policies and Issues (Irregular) Explores health care management strategies and policy development with emphasis on health insurance, Medicare, Medicaid and managed care, as well as employee health benefits. The roles of government and business in policy formulation are addressed, as are the problems of financing health care, legal and ethical considerations, current healthcare issues, and quality measures.

OMGT5373 Quality Management (Irregular) Introduces students to quality management concepts and their use in enhancing organizational performance and profitability. History of the quality movement, its broad application in key economic sectors, and philosophical perspectives of major quality leaders will be discussed. Focus is on continuous process improvement, using data and information to guide organizational decision-making. The Six Sigma approach and associated statistical tools, supporting process improvement, are also covered. Prerequisite: OMT 4333.

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 practice.

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)

OMGT5443 Decision Models (Irregular) 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, Analytic Hierarchy Process, Bayes Theorem, Monte Carlo simulation, utility theory, risk analysis, group decision making and expert systems. Prerequisite: INEG 3313. (Same as INEG 5443)

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 investment alternatives. Required course (may be substituted by OMT 5123). Prerequisite: OMT 4323.

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. Prerequisite: OMT 4333.

OMGT5633 Linkages among Technology, Economics and Societal Values (Irregular) Addresses how macro-level change is influenced by the linkages among technology, economics and societal values. Three major course initiatives:

1) Developing a conceptual model for understanding how macro-level change has occurred over history; 2) Examining recorded history in order to develop a contextual appreciation for Society's current situation; and 3) Using statistical data to identify six overriding world trends that are likely to greatly impact society's goal of achieving sustainable prosperity and well-being in the foreseeable future. Prerequisite: Graduate standing or instructor permission (Same as BENG 5633)

OMGT5733 Human Behavior Analysis (Irregular) Examination of the principal drivers of individual and group behavior in organizations with coverage of practical applications of concepts in organizational behavior for operations managers. In addition to group behavior and organizational processes, the course explores people management challenges that result from external pressures on stakeholders (e.g. competitive, economic, social, political, and regulatory impacts).

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. May be repeated for up to 3 hours of degree credit.

OMGT5823 Information Technology for Operations Managers (Irregular) Information Technology for the management and control of information systems and processes used in operations management. Topics covered include e-Business and e-Commerce Systems, Management Information Systems (MIS), Data Resource Management, Networking, Decision Support, Information Security, Enterprise and Global IT, and IT Strategies and Solutions for Operations Managers. Prerequisite: OMT 4853.

OMGT5833 Decision Support Application Development for Operations Management (Irregular) Students will utilize Microsoft Excel and will write programming code in Visual Basic for Applications to develop custom solutions to challenging operations management problems. Emphasis will be placed on computing productivity in a spreadsheet-based setting to develop practical, useful decision support applications and computer programs to support operations management. Assumes basic knowledge of programming. Prerequisite: OMT 4853.

OMGT5873 Organization and Control (Irregular) Provides an overview of fundamental management functions, including planning, organizing, staffing, directing and controlling. Organizational decision-making authority, structures, and controls are examined. Topics also include leadership, motivational techniques, ethical perspectives on decision-making and corporate social and environmental responsibility. Required course (may substitute OMT 4623).

PHILOSOPHY (PHIL)

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- Professor Senor, Spellman
- Associate Professors Adler, Funkhouser, Lee, Lyons, Minar, Ward
- Assistant Professor McMullin

Degrees Conferred:
M.A., Ph.D. (PHIL)

Areas of Study: History of philosophy (including ancient, medieval, modern, early analytic, and contemporary), metaphysics, epistemology, ethics, social and political philosophy, philosophy of language, philosophy of mind, philosophy of religion, continental, 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 examination before the thesis committee. With the approval of the graduate committee, the oral 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. Only courses in which a "B" or better is earned count toward the 24 hours of course work required for the Ph.D.
 - b. 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.)
 - c. At least nine hours of graduate seminar work in philosophy.
 - d. By the time final course work is taken, students must have satis-

fied course distribution requirements comparable to those for the M.A. degree (1a., above).

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. Qualifying Examinations:
 - a. Comprehensive Exam: The student must pass a comprehensive examination of his or her main area of specialization.
 - b. Prospectus Exam: The student must write a dissertation proposal and pass an oral preliminary dissertation examination covering the proposal and the topic of the dissertation.
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 240 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 Neo-Platonism, 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 Pseudo-Dionysius. Prerequisite: 3 hours of philosophy.

PHIL4023 Medieval Philosophy (Fa) Includes Augustine, Bonaventure, Aquinas, Scotus, and Ockham.

PHIL4033 Modern Philosophy-17th and 18th Centuries (Sp) British and Continental philosophy, including Bacon, Descartes, Spinoza, Leibniz, 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 (Irregular) 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 (Irregular) From Frege to recent figures, including Russell, Moore, Wittgenstein, Schlick, Carnap, 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.

PHIL4093 Special Topics in Philosophy (Irregular) This course will cover subject matter not covered in regularly offered courses. May be repeated for up to 6 hours of degree credit.

PHIL4113 Social and Political Philosophy (Irregular) 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 (Irregular) 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, Searle, Dummett, and the advocates of possible world's 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. Prerequisite: PHIL 2203 or MATH 2603. (Same as MATH 4253)

PHIL4303 Philosophy of Religion (Irregular) 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.

PHIL5823 Seminar: Spinoza (Irregular)

PHIL5883 Seminar: Wittgenstein (Irregular)

PHIL5933 Seminar: Philosophical Theology (Irregular)

PHIL5983 Philosophical Seminar (Irregular) Various topics and issues in historical and contemporary philosophy. May be repeated for up to 3 hours of degree credit.

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

See the listing in the Department of Health Science, Kinesiology, recreation and Dance, page 116.

PHYSICAL SCIENCE (PHSC)

Lothar Schäfer

Chair of Studies

218 Chemistry Building

479-575-4601

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PHYSICS (PHYS)

Julio Gea-Banacloche

Department Chair

226 Physics Building

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Huaxiang Fu

Chair, Graduate Affairs Committee

226 Physics Building

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<http://www.uark.edu/depts/physics/>

- Distinguished Professors Salamo, Xiao
- Professors Bellaiche, Chakhalian, Gea-Banacloche, Harter, Lacy, Pederson, Singh, Stewart (G.), Thibado, Vyas
- Adjunct Professor Naseem
- Research Professor Vickers
- Associate Professors Fu, Li, Oliver
- Assistant Professors Barraza-Lopez, Kennefick (D.), Kennefick (J.), Shew, Stewart (J.)
- Adjunct Assistant Professor Schultz

Degrees Conferred:

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.

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.

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, 588V, or 590V project. A final comprehensive oral exam is given by the advisory committee.

Requirements for the Master of Science Degree: Students may choose between two Master of Science degrees in the physics department. These are the M.S. Physics (30-hour thesis path); and the M.S. Physics (36-hour non-thesis path). Both M.S. degree curricula prepare a student for the Physics Ph.D. degree.

Incoming graduate students will be advised by a departmental graduate adviser 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 adviser 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 adviser as chair and two members of the physics faculty. Students in this degree program can choose either a 30-semester-hour thesis path or a 36-semester-hour non-thesis path.

Both the thesis and non-thesis M.S. degrees share the following academic requirements: Completion of PHYS 5011 Seminar - Introduction to Current Physics Research; PHYS 5073 Mathematical Methods for Physics; PHYS 5413 Quantum Mechanics I; PHYS 5313 Advanced Electromagnetic Theory I; PHYS 5323 Advanced Electromagnetic Theory II; PHYS 5111 Research Techniques Through Laboratory Rotations; and PHYS 5041 Journal Club Seminar.

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 hour. 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	9	0	9
M.S. Physics non-thesis	18	0	18

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 30-hour requirement for the thesis option, and no more than two 4000-level courses may be counted toward the 36-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 adviser 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 adviser 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 the 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 5111 Research Techniques, PHYS 5041 Journal Club, PHYS 5073 Mathematical Methods for Electromagnetics, PHYS 5413/5423 Quantum Mechanics I and II, PHYS 5103 Advanced Mechanics; PHYS 5213 Statistical

Mechanics, and PHYS 5263L Experiment and Data Analysis.

A minimum grade of B is required in the following core courses: PHYS 5073 Mathematical Methods for Physics; PHYS 5413/5423 Quantum Mechanics I and II; PHYS 5313/5323 Advanced Electromagnetic Theory I and II; PHYS 5103 Advanced Mechanics; and PHYS 5263L 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.

Thirteen 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.

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 or CHEM 3504.

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.

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.

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.

PHYS4621L Modern Physics Laboratory (Fa) (Formerly PHYS 462L) Advanced experiments, projects, and techniques in atomic, nuclear, and solid state physics. Prerequisite: PHYS 3614

PHYS500V Seminar (Irregular) (1-3) Regular informal discussions of research reported in journals and monographs. May be repeated for up to 3 hours of degree credit.

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. In addition, the students will be introduced to scientific ethics, and learn communication skills.

PHYS502V Individual Study in Advanced Physics (Sp, Fa) (1-4) Guided study in current literature. May be repeated for up to 4 hours of degree credit.

PHYS5033 Design and Fabrication of Scientific Apparatus (Irregular) Students will learn mechanical and electronic techniques used in the design and fabrication of scientific apparatus. (This course cannot be used to satisfy degree requirements in any physics program.)

PHYS5041 Journal Club Seminar (Sp) In this seminar, the students will present talks based on published research articles. The goal of the course is to develop oral communication skills in the students. Effective literature search techniques will also be covered.

PHYS5073 Mathematical Methods for Physics (Fa) This course merges the mathematics required in classical mechanics, electrostatics, magnetostatics, and quantum mechanics into a single course. The goal is to develop physics problem-solving skills, a strong mathematical foundation, and a more unified picture of physics. Prerequisite: MATH 3423 and PHYS 3414.

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 (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 (Sp) 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 (Sp) 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.

PHYS5313 Advanced Electromagnetic Theory I (Fa) Electrostatics, boundary-value problems

in electrostatics, electrostatics in a medium, magnetostatics, and Faraday's Law.

PHYS5323 Advanced Electromagnetic Theory II (Sp) Maxwell equations, conservation laws, wave propagation, waveguides, radiating systems, scattering, special relativity, and radiation by moving charges.

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.

PHYS5613 Introduction to Biophysics and Biophysical Techniques (Sp, Fa) Origins of biophysics, biological polymers and polymer physics, properties of DNA and proteins, techniques to study DNA and proteins, biological membrane and ion channels, biological energy, experimental techniques to study single DNA and proteins. Two experiments are included: (1) DNA Gel electrophoresis; (2) Measurement of double-stranded DNA melting point. (Same as PHYS 4613)

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 Condensed Matter Physics I (Sp, Fa) The course covers the Drude theory and the Sommerfeld theory of metals, crystal lattices, reciprocal lattices, X-ray diffraction, Bloch's theory of electrons in periodic potential, formation of band gap, lattice vibration, and cohesive energy in solids. Prerequisite: PHYS 5413.

PHYS5723 Physics at the Nanoscale (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.

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, 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 up to 3 hours of degree credit.

PHYS5754 Applied Nonlinear Optics (Even 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.

PHYS5763 Experimental Methods for Nanoscience (Irregular) Fundamentals of the selected techniques suitable for characterization on the nanoscale. Focus on diverse methods such as x-ray and neutron spectroscopy, scanning probe microscopies, optical methods, electron diffraction methods and more.

PHYS5773 Introduction to Optical Properties of Materials (Sp) This course covers 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.

PHYS588V Selected Topics in Experimental Physics (Irregular) (1-3) May be repeated for up to 3 hours of degree credit.

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.

PHYS6513 Advanced Topics in Complexity (Irregular) The goal of the course is to give students tools to investigate the behavior of complex systems and to analyze the relationship of non-linear dynamics and chaos theory to complex biological and non-biological systems. A special emphasis will be given to understanding the way neurons work as biological computing elements.

PHYS6613 Quantum Optics (Even 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 Condensed Matter Physics II (Even years, Sp) The course covers surface physics, physics of homogeneous and inhomogeneous semiconductors, dielectric and ferroelectric physics, defects in crystals, spin interaction and magnetic properties, superconductivity, and band structure calculation. Prerequisite: PHYS 5713 and PHYS 5413.

PHYS700V Doctoral Dissertation (Sp, Su, Fa) (1-18) May be repeated for up to 18 hours of degree credit.

PLANT PATHOLOGY (PLPA)

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- University Professors Robbins, TeBeest
- Professors Bennett, Correll, Kirkpatrick, Korth, Milus, Rothrock, Rupe
- Associate Professors Spradley, Tzanetakis
- Assistant Professors Bluhm, Vann
- Research Assistant Professor Saylor
- Adjunct Professor Chen
- Adjunct Associate Professors du Toit, Jia
- Adjunct Assistant Professors Cartwright (D.K.), Martin

Degree Conferred:

M.S. (PLPA)
 Ph.D. (PTSC) See Plant Science

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).

Plant Pathology (PLPA)

PLPA400V Research (Sp, Su, Fa) (1-6) Original investigations of assigned problems in plant pathology. Prerequisite: PLPA 3004.

PLPA4223 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. (Same as BIOL 4133)

PLPA4304 Applied Plant Disease Management (Irregular) A plant pathology course empha-

sizing practical understanding of the concepts and principles of agronomic and horticultural crop disease management, including disease diagnosis, monitoring, and using models to forecast disease events. Prerequisite: PLPA 3004 or instructor consent.

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. (Same as BIOL 4333)

PLPA5001 Seminar (Sp, Fa) Review of scientific literature and oral reports on current research in plant pathology. Prerequisite: Graduate standing. May be repeated for up to 4 hours of degree credit.

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 up to 18 hours of degree credit.

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.

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 related saprophytic fungi. Corequisite: Lab component. Prerequisite: PLPA 3004 or BIOL 4424 or graduate standing.

PLPA600V Master's Thesis (Sp, Su, Fa) (1-6) Prerequisite: Graduate standing.

PLPA6203 Plant Virology (Even 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: Lab component. 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 up to 3 hours of degree credit.

PLANT SCIENCE (PTSC)

Interdepartmental Doctoral Program, Departments of Horticulture and Plant Pathology

Ioannis E. Tzanetakis
 Chair of Studies
 213 Plant Sciences Building
 479-575-2603
 E-mail: izaneta@uark.edu

<http://plantpathology.uark.edu/2261.htm>

- University Professors Clark, Robbins, TeBeest
- Professors Correll, Evans, Garcia, Hensley, Kirkpatrick, Korth, Milus, Murphy, Richardson, Rom, Rothrock, Rupe
- Associate Professors Andersen, Karcher, Lindstrom, Robbins (J.), Srivastava
- Adjunct Associate Professors Brooks, Jia
- Assistant Professors Bluhm, Faske, McDonald, Saylor, Tzanetakis, Wamische
- Adjunct Assistant Professors Cartwright (D.K.), Martin, Xia

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, diseases of crop plants,

Plant Sciences (PTSC)

mycotoxicology, 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 a statement of interest, three letters of recommendation, which evaluate the potential of the student to pursue advanced graduate studies, and scores from the Graduate Record Examinations. International students must submit TOEFL scores with their application. 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, 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 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 4223, 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.

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 up to 2 hours of degree credit.

PTSC6203 Laboratory Instrumentation in Plant Science (Irregular) 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)

Margaret F. Reid
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<http://www.uark.edu/depts/plscinfo/>

- Professors Gaber, Kelley, Kerr, Parry, Reid, Shields, Zeng
- Associate Professors Conge, Dowdle, Ghadbian, Ryan, Schreckhise
- Assistant Professors Dowe, Jimeno, Maxwell, Mitchell, Song, Stewart
- Research Assistant Professor Hunt
- Adjunct Professors Davis, Purvis, Smith, Wicks

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)

Graduate Certificates Offered (non-degree):

Cross-Sector Alliances. See <http://grad.uark.edu/crosssectoralliance>

M.A. Areas of Study: 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 adviser'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 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.

Political Science (PLSC)

- PLSC400V Special Topics (Irregular) (1-3)** Topics in political science not usually covered in other courses. May be repeated for credit.
- 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 (Irregular)** 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. Prerequisite: PLSC 2003
- PLSC4243 Minority Politics (Even years, Sp)** Reviews political action and concepts of political activity by minority groups, focusing on contemporary political behavior.
- PLSC4253 The U.S. Constitution I (Sp)** 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 U.S. Constitution II (Irregular)** United States Supreme Court decisions interpreting the political, economic, and civil rights of individuals and groups. Prerequisite: PLSC 2003.
- PLSC4283 Federalism and Intergovernmental Relations (Even years, Sp)** 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.
- PLSC4293 African American Politics (Fa)** This is a survey course designed to provide students with a comprehensive overview of African American political participation in the United States. In addition to analyzing important events in African American Politics, the course attempts to explain evolving patterns of political participation in Black America. (Same as AAST 3293, PLSC 3293)
- PLSC4303 History of Political Parties in the U.S. 1789-1896 (Even years, Fa)** Origin and development of the American party system from the implementation of the Constitution to the election of McKinley. (Same as HIST 4503)
- PLSC4313 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. (Same as HIST 4513)
- PLSC4323 Racial Identity, Politics, and Public Policy (Even years, Sp)** Examines how race and perceived racial differences affect political discourse, mobilization, representation, and political outcomes. Prerequisite: PLSC 4293 or AAST 1003 or 3233 or 3243.
- PLSC4333 Southern Politics (Sp)** Evaluates the significance of the southern region within the national political scene, as well as discuss the unique political history and workings of the region. Explores the various groups within the region that continue to fight for political influence and power.
- PLSC4373 Political Communication (Even years, Sp)** Study of the nature and function of the communication process as it operates in the political environment. (Same as COMM 4373)
- 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.
- PLSC4563 Government and Politics of Russia (Even years, 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 (Irregular)** 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.
- PLSC4593 Islam and Politics (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 (Irregular)** 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 (Even years, Sp)** 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 (Fa)** 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 (Irregular)** 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.
- PLSC4933 African American Political Ideology (Odd years, Sp)** A survey course designed to identify and examine characteristics and functions of several variants of black political ideology/thought. (Same as AAST 4933)
- 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 (Fa)** 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 (Irregular)** 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.
- PLSC5143 Administrative Law (Sp)** 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 are 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 (Fa)** 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.
- PLSC5173 Community Development (Irregular)** Community development encompasses the political, social, and economic issues that shape contemporary communities. The seminar examines substantive issues in community development, related theories, and techniques. A major focus of the course will be on low-income and minority neighborhoods and efforts to create more inclusive communities in the U.S. and abroad.
- 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.
- PLSC5233 The American Chief Executive (Odd years, Sp)** Study of the origin, background, and evolution of the Office of the President of the United States, with a review of the president's powers in the areas of politics, administration, and legislation.
- PLSC5243 Seminar in State Politics and Policy (Even Years, Fa)** Research seminar dealing with selected aspects of state political institutions and politics such as policy diffusion, institutional professionalization, and representation. 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. (Same as COMM 5383)
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 (Irregular) 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 (Irregular) In-depth 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.

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 up to 6 hours of degree credit.

PLSC5843 International Legal Order (Fa) 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 up to 6 hours of degree credit.

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 up to 3 hours of degree credit.

PLSC595V Research Problems in Political Science (Sp, Su, Fa) (1-3) Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

PLSC5983 Mixed Methods Research Design (Sp) An advanced overview of a particular type of multi-point research design. Mixed methods research combines quantitative and qualitative research strategies in a single research project.

PLSC600V Master's Thesis (Sp, Su, Fa) (1-6)

Public Administration (PADM) (M.P.A.)

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 scores of 155 on the verbal portion and 145 on the quantitative portions of the current 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. A written essay, submitted in accordance with standards set by the PLSC Admissions Committee.
5. Three letters of recommendation from persons competent to judge the applicant's academic/work experience.
6. 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.
7. All requirements listed above must be completed and reported be-

fore 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 courses from the following 10 courses:

PLSC 5103 Human Behavior in Complex Organizations

PLSC 5113 Seminar in Human Resource Management

PLSC 5123 Public Budgeting and Finance

PLSC 5133 Management of Service Sector Organizations

PLSC 5143 Administrative Law

PLSC 5153 Environmental Politics and Policy

PLSC 5163 Public Policy Formation and Analysis

PLSC 5243 Seminar in State Politics and Policy

PADM 5823 Grant Writing for the Social Sciences

PADM 584V Special Topics in Public Administration

Special Interest Areas: 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 community development, environmental policy and sustainability, health services administration, higher education administration, non-profit management, public policy, and recreation and tourism. Other concentrations may be exercised with the consent, advice and approval of the M.P.A. Program Director. Students who elect to take only twelve hours may satisfy the remainder of the required degree hours with optional thesis or professional development/internship credit (please see below).

Mandatory Comprehensive Examination: All students will be required to take a written comprehensive examination covering their M.P.A. program or complete a six-hour thesis. The comprehensive exam will be graded by at least a three-person faculty committee selected by the M.P.A. Program Director. Students pursuing the thesis option are not required to take a written examination. Rather, successful defense of their thesis satisfies this requirement. In addition to the successful completion of all course requirements and a passing grade on the written comprehensive examination (if taken), each student must present a minimum cumulative grade-point average of 3.00.

Thesis Option: Students wishing to exercise the thesis option should consult with the graduate coordinator of the Department of Political Science. The thesis committee must be composed of at least three faculty members. The chair and another faculty member must be PLSC faculty. Thesis credit is six hours.

Professional Development/Internship: (1-6 semester hours). The professional development/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.

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. in Political Science and the J.D. degrees concurrently.

The program described below requires 36 hours as follows: the student selects a) 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); b) 6 additional hours of PLSC courses approved by the program's graduate director or 6 hours of thesis credit; and c) 12 hours of elective courses taken in the law school in an area of concentration approved by the director of the M.A. program.

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 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; ; 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.

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 all required course work, as well as the successful defense of a master's thesis, if applicable.

Mandatory Comprehensive Exam: All students will be required to take a written comprehensive examination covering their M.A. program or a 6-hour thesis. The comprehensive exam will be graded by at least a three-person faculty committee selected by the M.A. Program Director. Students pursuing the thesis option are not required to take a written examination. Successful defense of their thesis satisfies this requirement. In addition to the successful completion of all course requirements and a passing grade on the written comprehensive examination (if taken), 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. advisers. 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.

Mandatory Comprehensive Exam: 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. Students pursuing the thesis option are not required to take a written examination. Rather, successful defense of their thesis satisfies this requirement. 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.

Thesis Option: Students pursuing the thesis option should consult with 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 six hours.

Internships: Students may pursue an internship. Internship credit is variable and depends on the number of hours worked. Students wanting internship credit must consult with the M.P.A. adviser who will develop an internship work plan and explain expected academic work products.

Public Administration (PADM)

PADM5803 Quantitative Methods Analysis (Fa) Data analysis techniques, including descriptive and inferential statistics and packaged computer programs. Prerequisite: Graduate standing.

PADM5813 Methods in Public Management Information (Fa) Nature and use of public information systems. Includes: basic understanding of hardware, applications, network, and communication technologies, data and information; their use for data analysis and management, and decision support; discussion of technologies' societal impact, and security and ethical considerations. Prerequisite: Graduate standing.

PADM5823 Grant Writing for the Social Sciences (Irregular) This course will teach students the fundamentals of obtaining grants from local, state and federal agencies.

PADM5833 Urban Planning (Fa) Reviews the many forms, functions, and purposes of American cities. Covers basic planning theories, surveys the various sub-fields of planning, discusses trends in the planning field, and utilizes computer simulations.

PADM584V Special Topics in Public Administration (Sp) (1-3) Topic varies. Prerequisite: PLSC 5193. May be repeated for up to 6 hours of degree credit.

PADM5853 Performance Measurement in the Public and Nonprofit Sectors (Su) Provides

a hands-on approach for measuring organizational performance and using performance information of decision making. Addresses components and key issues of performance measurement, such as steps in the measurement process, methods of data gathering, and analysis. Prerequisite: PLSC 5193.

PADM5863 Issues in Public and Nonprofit Management (Sp) Explores current developments and themes in the theory and practice of public and nonprofit management. Covers a range of contemporary issues in the field, such as managing collaborative networks, e-government, and managing for results. Emerging trends are intensively discussed at the juncture of theory and practice.

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)

Michael Kidd
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- University Professors Chapman, Waldroup (P.W.)
- Professors Anthony, Bottje, Coon, Erf, Goodwin, Hargis, Kuenzel, Li, Marcy, Slavik, Vizzier-Thaxton, Watkins, Wideman
- Research Professors Donoghue (A), Huff (B), Huff (G.), Rath
- Associate Professors Bramwell, Kwon, Owens
- Assistant Professor Kong
- Research Assistant Professor Pumford

Degrees Conferred:
M.S., Ph.D. (POSC)

Primary Areas of Faculty Research: Avian parasitology; avian physiology; avian virology; food safety/microbiology; immunology; molecular biology; poultry breeding and genetics; poultry economics; poultry enterprise operations; poultry health; poultry meat quality; poultry nutrition; poultry product technology; and turkey and egg product/management.

Areas of Study: Graduate studies may be pursued in those areas of primary faculty research. 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: For the M.S. degree, at least 24 hours of course work and six hours of thesis must be completed. No more than 12 hours or three courses at the 4000 level may be used for credit. A maximum of four hours of 5000 Special Problems may be used for M.S. degree requirements. At least three courses should be taken in the Poultry Science Department. At least one seminar is required for all M.S. degree candidates.

A minimum GPA of 3.0 is required for the M.S. degree. All M.S. candidates must complete a thesis based on their research and pass a final comprehensive exam with emphasis on thesis research. One manuscript suitable for publication in a refereed journal is required for each M.S. candidate to graduate.

Requirements for the Doctor of Philosophy Degree: Ph.D. candidates bypassing the M.S. degree must take at least 36 hours of course work approved by the student's advisory committee with at least 24 hours of 5000 and 6000 level course work excluding Special Problems. No more than 12 hours or three courses at the 4000 level may be used for credit. A maximum of four hours of 5000 Special Problems can be used for the Ph.D. degree requirements. Students in the Ph.D program who have an M.S. degree must take at least 12 hours of 5000 and 6000 level course work excluding Special Problems. If not taken previously, a three hour statistics course is required for graduation for all Ph.D. candidates. A minimum of two seminars is required of all Ph.D. candidates. All Ph.D. degree candidates must take 18 hours of dissertation research. Admission to candidacy requires the candidate to take a comprehensive written exam as determined by members of the student's Graduate Advisory Committee and a preliminary oral exam given by the Graduate Advisory Committee. Any student who fails the admission to candidacy exams will not be permitted to reschedule the exams for a six-month period. A second failure will lead to termination from the program. A final oral examination will be taken that is a defense of the dissertation. A minimum GPA of 3.0 is required for the Ph.D. degree. Two manuscripts suitable for publication in a refereed journal are required for each Ph.D. student to graduate. These papers will be evaluated by the Graduate Advisory Committee for comments and approval.

Poultry Science (POSC)

POSC4033 Statistical Process Control in the Food Industry (Irregular) Analysis of processing data related to compliance with regulatory limits, quality & safety limits and internal & external customer specifications. Emphasizes statistical process control chart development, including understanding data and chart selection, calculating statistical limits, and interpreting process performance. Prerequisite: Instructor consent.

POSC4213 Integrated Poultry Management Systems (Even years, 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 AGECE 1103 and AGECE 2303.

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.

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 credit.

POSC5113 Food Toxicology and Contaminants (Irregular) During this course, the student will learn basic concepts of food toxicology, study the different physiological processes involved in food borne intoxications, and learn about potential health problems associated with exposure to these compounds. Prerequisite: Graduate study.

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)

POSC5233 Value Added Muscle Foods (Even years, Sp) An intense study of muscle structure and how it relates to the development of further processed meat products. Muscle ultrastructure, protein functionality, product development, and quality analysis will be covered. In class hands on activities will also be included to allow students to obtain experience of producing processed meat products.

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 (Odd years, Sp) An in-depth coverage of the most important diseases of poultry with a focus on understanding mechanisms of pathogenesis, diagnostic techniques and principles of prevention. Lecture/discussion 2 hours per week. 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. (Same as ANSC 5743L)

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.

POSC5923 Brain and Behavior (Fa) Covers cellular through neural systems, major brain functions and comparative neuroanatomy. Topics include ion channels, membrane and action potentials, synaptic integration, neurotransmitters, major brain regions of mammals and birds, sensory and autonomic nervous systems, neuroendocrinology, and control by the brain of critical functions and behavior. Lecture 3 hours per week; 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, or PSYC 2003, or BIOL 2213, or BIOL 2443, or BIOL 2533.

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)

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 (Fa) 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.

PSYCHOLOGICAL SCIENCE (PSYC)

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<http://www.uark.edu/depts/psyc/>

- Professors Behrend, Beike, Cavell, Lampinen, Schroeder, Stripling
- Associate Professors Feldner, Freund, Ham, Leen-Feldner, Levine, Petretic, Williams
- Assistant Professors Bridges, Eidelman, Veilleux
- Visiting Assistant Professor Zies
- Adjunct Assistant Professors Bosc, Cline, Harbin, Irwin, Judges, Perry

Degrees Conferred:
 M.A., Ph.D. (PSYC)

Areas of Study: 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. Although some of our graduates obtain applied, direct service provision positions, our training curriculum is such that those students whose career aspirations have been directed toward academic 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 Developmental Psychopathology, 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 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.
- 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 5153, PSYC 5163, PSYC 5313, PSYC 6083, PSYC 6133, PSYC 6163, PSYC 6213, and PSYC 6223.
 - 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.
 - All students must pass a written candidacy examination at a time recommended by the student's advisory committee.
 - 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)

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: Six hours of psychology, not including PSYC 2014.

PSYC4053 Psychological Tests (Irregular) Nature and theory of individual and group tests of intelligence, personality, interests, and attitudes. Prerequisite: Nine hours of psychology, including a C or better in PSYC 2013.

PSYC4063 Psychology of Personality (Irregular) Theories and representative research concerning the development and nature of the normal personality. Prerequisite: Six hours of psychology, not including PSYC 2014.

PSYC4073 Psychology of Learning (Sp) Theories and representative research on basic principles of learning and memory in both animals and humans. Prerequisite: Six hours of psychology, not including PSYC 2013.

PSYC4123 Perception (Irregular) Theories and representative research in the areas of sensation and perception. Prerequisite: Six hours of psychology, not including PSYC 2013.

PSYC4183 Behavioral Neuroscience (Fa) Examination of the biological basis of behavior. Surveys the anatomy, physiology, and pharmacology of the mammalian brain and examines brain mechanisms underlying a wide range of behaviors and cognitive processes. Prerequisite: Six hours of psychology, not including PSYC 2013.

PSYC4193 Comparative Psychology (Sp) Analysis of animal behavior from an evolutionary perspective, with emphasis on the role of the environment and interactions with other animals in shaping the evolution of behavior within a species, and the evolution of differences in behavior between species. Prerequisite: Six hours of psychology, not including PSYC 2013.

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) 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.

PSYC5080 Observational Practicum (Sp, Su, Fa) Observation of senior therapists in the provision of psychodiagnostic and psychotherapeutic techniques. Pre- or Corequisite: Psychology Ph.D. students only. May be repeated for up to 0 hours of degree credit.

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.

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.

PSYC5153 Advanced History and Systems of Psychology (Fa) Advanced examination of the concepts, methods, and systems which have contributed to the development of modern psychology.

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.

PSYC6083 Clinical Supervision and Consultation (Sp, Fa) An introduction to empirically based models of clinical supervision and professional consultation for clinical psychologists. Prerequisite: PSYC 607V; 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 up to 3 hours of degree credit.

PSYC611V Individual Research (Sp, Su, Fa) (1-18) May be repeated for up to 18 hours of degree credit.

PSYC6133 Advanced Behavioral Neuroscience (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.

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.

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).

PSYC6343 Seminar in Quantitative Methods (Irregular) Discussion of selected mathematical approaches to theorizing and research in psychology. Emphasis will be on generalization of a given approach across several content areas of psychology. Hence, while each area must be treated in reasonable depth, current thinking and research spanning more than one content area will be stressed.

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 credit.

PSYC699V Clinical Psychology Internship (Sp, Su, Fa) (1-3) Supervised experience in a multidisciplinary setting of assessment and psychotherapy. May be repeated for credit.

PSYC700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

PUBLIC ADMINISTRATION

See Political Science, page 146.

PUBLIC POLICY (PUBP)

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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 Specialization: Agricultural Policy, Community Development, Education Policy, Environmental Policy, Family Policy, Health Policy, Policy Studies in Aging, Public Policy Management, and Recreation Policy. (Other areas of concentration 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 3.20 on a 4-point scale for all graduate course work is required. Scores from the verbal and quantitative portions of the Graduate Record Examination (GRE) must be submitted. GRE scores may not be more than five years old. 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 65 hours including:

Core requirements, 23 hours:
 PUBP 6001 Pro-Seminar
 PLSC 5163 Public Policy
 SOCI 5133 The Community (or equivalent course)
 Economics and Policy (3 hours selected from approved courses)

PUBP 6023 Law and Public Policy
 PUBP 6103 Policy Leadership Seminar
 PUBP 6113 Agenda Setting and Policy Formation
 PUBP 6134 Capstone Seminar in Public Policy
 Methods, 12 hours:
 ESRM 6533 Qualitative Research (or equivalent course)
 Quantitative Methods (3 hours selected from approved courses)
 Advanced Research Methods (6 hours selected from approved courses)
 Electives in area of concentration, 12 hours: See program director for concentration requirements.

Dissertation Research, 18 hours: (PUBP 700V)

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 core and specialization studies as well as research methods. The examinations will be both written and oral. After having been admitted to candidacy, students will be required to successfully defend a dissertation proposal in front of their dissertation committee. 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. 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.

PUBP6023 Law and Public Policy (Fa) 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. Pre- or corequisite: PUBP 6012.

PUBP604V Special Topics in Public Policy (Irregular) (1-6) Designed to cover specialized topics not usually presented in depth in regular courses. May be repeated for up to 6 hours of degree credit.

PUBP6103 Policy Leadership Seminar (Irregular) 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 interagency settings.

PUBP6113 Agenda Setting and Policy Formulation (Irregular) 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 up to 6 hours of degree credit.

PUBP6134 Capstone Seminar in Public Policy (Sp, Fa) This course is intended to integrate various policy interests in a specific community based project.

PUBP700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: candidacy. May be repeated for up to 18 hours of degree credit.

RECREATION AND SPORT MANAGEMENT (RESM)

See the listing in the Department of Health Science, Kinesiology, Recreation and Dance, page 116.

REHABILITATION (RHAB)

See the listing in the Department of Rehabilitation, Human Resources, and Communication Disorders, next.

REHABILITATION, HUMAN RESOURCES, AND COMMUNICATION DISORDERS, DEPARTMENT OF (RHRC)

Fran W. Hagstrom
 Department Head
 100 Graduate Education Building
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<http://rhrc.uark.edu/>

- Professors Biggs, Farley, Gearhart, Hammons, Koch, Miller
- Associate Professors DeVore, Hagstrom, Hughes, Kacirek, Kissinger, McCray, Murry, Pugh, Thompson (D.), Toner, Williams
- Assistant Professors Baker, Bowers (A.), Bowers (L.), Greenleaf, Grover, Hevel, Lusk, Mamiseishville
- Clinical Assistant Professors Agan, Beck, Schmidtke
- Adjunct Clinical Supervisors Perry, Still
- Research Associate Aslin
- Instructors McGehee, Stephen
- Adjunct Instructor Guenther

Degrees Conferred:

M.Ed., Ed.D. in Adult and Lifelong Learning (ADLL)
 M.Ed., Ed.D. in Higher Education
 M.Ed., Ed.D. in Human Resources and Workforce Development
 M.S. in Communication Disorders (CDIS)
 M.S., Ph.D. in Counselor Education (CNED)
 M.S., Ph.D. in Rehabilitation (RHAB)

Primary Areas of Faculty Research: Faculty are engaged in research activities specific to their program areas. These range from bullying behaviors in elementary school and community college leadership to swallowing disorders and human resource management. Contact individual faculty members or visit the Web site for more information about research in the department.

ADULT AND LIFELONG LEARNING (ADLL) (M.ED., ED.D.)

Kenda Grover
 ADLL M.Ed. Program Coordinator
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 479-575-2675
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Kit Kacirek
 ADLL Ed.D. Program Coordinator
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E-mail: kitk@uark.edu
 Website: <http://adll.uark.edu>

Degrees Conferred:

M.Ed., Ed.D. (ADLL)

The Adult and Lifelong Learning curriculum is designed to prepare scholars/practitioners for instructional leadership roles. Coursework focuses on the assessment, design, and implementation of educational programs for adult learners across diverse developmental stages. Adult and Lifelong Learning scholars/practitioners work with specialized groups of adults including those

with less than secondary (high school equivalent) education, adult learners in postsecondary education, participants in educational programs offered by community and nonprofit agencies, and participants in professional education programs.

Graduates of the degrees in Adult and Lifelong Learning are employed as instructors, coordinators, and directors of adult education and lifelong learning programs within adult literacy and general education development, leisure learning, community and nonprofit organizations, extension education, military education, postsecondary education, and continuing professional education programs.

Prerequisites for Acceptance to the Master of Education Degree Program: In addition to meeting requirements for admission to the Graduate School, all students seeking admission to the M.Ed. program in Adult and Lifelong Learning must submit (1) a program application that is located on the ADLL website (<http://adll.uark.edu>), and (2) a current resume.

Requirements for the Master of Education (M.Ed.) Degree: (Minimum 33 hours)

1. Completion of three semester hours in the area of research and statistics
 - ESRM 5013 Research Methods in Education or
 - ESRM 5393 Statistics in Education and Health Professions
2. Completion of 15 semester hours of Adult Education Core
 - ADLL 5113 Perspectives in Adult Education
 - ADLL 5123 Principles and Practices of Adult Learning
 - ADLL 5133 Curriculum Development in ABE and ASE
 - ADLL 5143 Instructional Strategies and Assessment in Adult Education
 - ADLL 5153 Organization and Administration of Adult and Lifelong Learning Programs
3. Completion of 12 semester hours of Adult and Lifelong Learning electives
 - ADLL 5163 Managing Change in Adult and Lifelong Learning
 - ADLL 5173 Program Planning
 - ADLL 5183 Technology and Innovation in Adult Learning
 - ADLL 5193 Seminar in Adult and Lifelong Learning (may be repeated for nine hours provided that the topic changes).
 - ADLL 5213 Adult and Lifelong Learning Internship
4. Completion of three hours of Capstone Course
 - ADLL 5223 Applied Project
5. A cumulative grade point average of at least 3.00 on all course work for the degree. No grades below "C" will be accepted for credit toward this degree.
6. Satisfactory performance on a written comprehensive examination.

Prerequisites for Acceptance to the Doctor of Education Degree Program: The Ed.D. in Adult and Lifelong Learning is a cohort-based program; applications are accepted approximately four months prior to the beginning of each cohort cycle. Cohort cycles begin approximately every two years. The anticipated timeline for program cohorts and application deadlines will be posted on the program's website (<http://adll.uark.edu>).

Students seeking admission to the Ed.D. program in Adult and Lifelong Learning must complete procedures that include (1) prior admission to the University of Arkansas Graduate School, which requires a separate application process; (2) a completed Adult and Lifelong Learning Application for Admission form; (3) a current resume or vitae; (4) an autobiographical sketch; (5) a Graduate Record Examination (GRE) score; and (5) a personal interview with members of the Adult and Lifelong Learning faculty.

Adult and Lifelong Learning faculty consider several factors when reviewing applicants for admission to the program, including professional experience

related to adult and lifelong learning, demonstration of interest in a career in adult education and lifelong learning, grade point average on all graduate work completed, and Graduate Record Examination (GRE) composite scores (verbal, quantitative, and analytical writing) that demonstrate the student's ability to effectively perform academically at the doctoral level (test scores usually no lower than the 50th percentile).

Requirements for the Doctor of Education Degree: (Minimum 96 hours)

1. Completion of 15 semester hours in the area of research and statistics
 - ESRM 6403 Education Statistics and Data Processing
 - ADLL 6413 Quantitative Reasoning in Adult and Lifelong learning OR ESRM 6623 Techniques of Research
 - ADLL 6423 Qualitative Reasoning in Adult and Lifelong Learning OR ESRM 6533 Qualitative Research
 - ADLL 6433 program Evaluation OR ESRM 6613 Evaluation of Politics, Programs, and Projects
 - ADLL 6443 Adult and Lifelong Learning Dissertation Seminar
2. Completion of 21 semester hours of Adult and Lifelong Learning Core
 - ADLL 6113 Advanced Adult Learning Theory
 - ADLL 6123 Leadership and Ethics in Adult and Lifelong Learning
 - ADLL 6133 Analysis of International Adult and Lifelong Programs
 - ADLL 6143 Instructional Adaptation and Innovation in Adult and Lifelong Learning
 - ADLL 6513 Policy and Public Governance of Adult and Lifelong Learning Programs
 - ADLL 6163 Adult Development and Psychology
3. Completion of Adult and Lifelong Learning Electives (as needed to meet degree hour requirements)
 - ADLL 6173 Current Issues
 - ADLL 6313 Independent Study

*Students who do not hold a master's degree in adult education may select electives from course work applicable to the M.Ed. in Adult and Lifelong Learning or may take courses from related areas of study with the consent of their adviser.
4. Completion of 18 semester hours of Dissertation Research
 - ADLL 700V Doctoral Dissertation
5. A minimum grade point average of 3.25 on all course work presented as part of the degree program. Course with grades of "C" or below will not count toward the degree.
6. Satisfactory completion of all requirements governing the written and oral examinations for the candidacy examination, the dissertation, and the final oral dissertation defense.

Adult and Lifelong Learning (ADLL)

ADLL5113 Perspectives in Adult Education (Sp, Fa) Historical overview of the evolving field of adult education and lifelong learning in responsibilities of adult education providers and reviews the expansion of adult and lifelong learning opportunities associated with societal and demographic shifts.

ADLL5123 Principles and Practices of Adult Learning (Su, Fa) Overview of the adult learner including characteristics, motivation for participating in learning, and strategies for developing educational programs for diverse adult populations.

ADLL5133 Curriculum Development in ABE and ASE (Fa) Curriculum development in Adult Basic Education (ABE) and Adult Secondary Education (ASE) settings including the various educational functioning levels, measures to assess student levels, selection of teaching materials, and development of curriculum utilizing instructional standards for ABE and ASE programs.

ADLL5143 Instructional Strategies and Assessment in Adult Education (Sp) Selection and utilization of materials and instructional methods for use in adult learning settings. Evaluative strategies to develop or select appropriate tools and techniques predicated upon the needs and goals of adult learners.

ADLL5153 Organization and Administration of Adult and Lifelong Learning Programs (Sp) Legal, ethical, staffing, and financial considerations for the development and implementation of

programs for adult and lifelong learners in various programs including literacy centers, GED centers, community education, lifelong/leisure learning, and postsecondary education.

ADLL5163 Managing Change in Adult and Lifelong Learning (Su, Fa) Strategies for planning, organizing, and facilitating change in programs that serve adult learners from diverse populations, across varied developmental stages and geographic locations. Discussion of social change that has impacted adult education and analysis of change models relevant to individuals, groups and organizations.

ADLL5173 Program Planning (Su) Program development process for adult and lifelong learners. Overview of assessment, developing program objectives, identifying resources, and designing program plans.

ADLL5183 Technology and Innovation in Adult Learning (Su) Techniques for designing, developing, implementing, and assessing technology-mediated adult and lifelong learning programs. Discussion of issues relevant to the use of innovative strategies for delivering instruction via emerging technologies and their potential impact on content and learning outcomes.

ADLL5193 Seminar in Adult and Lifelong Learning (Sp, Su) Seminars focused on topics related to adult and lifelong learning.

ADLL5213 Adult and Lifelong Learning Internship (Sp, Fa) Internship in adult and lifelong learning settings

ADLL5223 Adult and Lifelong Learning Applied Project (Sp, Su, Fa) Development and Implementation of a project focused on adult and lifelong learning. Consent of advisor/instructor required.

ADLL6113 Advanced Adult Learning Theory (Irregular) Advanced study of theories and models of adult and lifelong learning with an emphasis on current trends, recent research, and issues affecting the field. Issues covered will include critical theory and advancements in neuroscience and cognition as they relate to adult learning and lifespan development.

ADLL6113 Advanced Adult Learning Theory (Irregular) Advanced study of theories and models of adult and lifelong learning with an emphasis on current trends, recent research, and issues affecting the field. Issues covered will include critical theory and advancements in neuroscience and cognition as they relate to adult learning and lifespan development.

ADLL6123 Leadership and Ethics in Adult and Lifelong Learning (Irregular) This doctoral course focuses on leadership principles and ethical considerations that are critical to developing and sustaining adult education programs that benefit individuals, organizations, and communities. Course content will include case study analysis and lectures from scholar-practitioners from the field.

ADLL6133 Analysis of International Adult and Lifelong Programs (Irregular) Survey of the historical and philosophical events which have shaped adult and lifelong learning worldwide. Discussion of issues affecting adult education and lifelong learning including globalization, educational access, and variance in national policies. □

ADLL6143 Instructional Adaptation and Innovation in Adult and Lifelong Learning (Irregular) An overview of teaching and learning methods, styles, and techniques which are applicable when facilitating adult learners across diverse settings. Content to include teaching and learning style assessment, accommodating learning styles, physical and learning disabilities, language differences and cultural norms. □

ADLL6153 Policy and Public Governance of Adult and Lifelong Learning Programs (Irregular) Policy analysis and public governance issues in adult and lifelong learning with emphasis on state and federal programs. Discussions of how to evaluate, design, and implement policy focused on promoting adult and lifelong learning activities in a myriad of organizations. □ Overview of trends and current issues related to policy and public governance of adult and lifelong learning. □

ADLL6163 Adult Development and Psychology (Irregular) Focus on adult developmental psychology with emphasis on lifespan development and specific issues related to learning in the various stages of adulthood. Work-life balance, meaning of work, generational issues.

ADLL6173 Current Issues (Irregular) Exploration and discussion of current issues relative to adult education and lifelong learning. Focus on the review and application of current research as it relates to practice. May be repeated for up to 6 hours of degree credit.

ADLL6313 Independent Study (Irregular) Independent study of topics in adult and lifelong learning.

ADLL6413 Quantitative Reasoning in Adult and Lifelong Learning (Irregular) Methodologies for designing descriptive, correlational, and experimental studies. Development of research questions, definition of variables, selection or development of instruments, data collection, analysis, interpretation and reporting of research results. Prerequisite: ESRM 6403 or equivalent.

ADLL6423 Qualitative Reasoning in Adult and Lifelong Learning (Irregular) Methodologies for designing qualitative research studies in adult and lifelong learning settings. Selection of the appropriate qualitative tradition, selection of research subjects, development of data collection protocols, field work strategies, data analysis, data interpretation and presentation of data results.

ADLL6433 Program Evaluation (Irregular) Overview of evaluation strategies in adult and lifelong learning programs that include: development of evaluation questions, selection or development of instrumentation, data collection methods, data analysis, and reporting of evaluation results. Emphasis on practical and ethical issues associated with evaluation processes. Prerequisite: ESRM 6403 or equivalent.

ADLL6443 Adult and Lifelong Learning Dissertation Seminar Development of dissertation proposal. Formation of research question, selection of methodologies, development of problem statement, research questions, and identification of research variables, constructs of phenomena. Identification of data collection and data analysis procedures. Prerequisite: ESRM 6403, ADLL 6413, and ADLL 6323.

ADLL700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

COMMUNICATION DISORDERS (CDIS) (M.S.)

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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 Adviser for further information. To be considered for admission to graduate study in communication disorders (emphasis in speech-language pathology), applicants must have a minimum overall GPA of 3.00 in undergraduate course work and must submit transcripts of all college-level coursework, a personal statement, and three letters of recommendation from persons competent to judge the applicant's potential for graduate studies. If an applicant does not have a minimum 3.0 GPA, scores from the Graduate Record Examination must be submitted. Students are only accepted for Fall admission. The application deadline is February 1 and must be completed using the CSDCAS centralized electronic application process (see the CDIS program website for details). Incomplete and/or late applications will not be considered. Admission decisions are based on demonstrated graduate potential as well as best fit for the program.

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 (Sp) 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. Pre- or Corequisite: Prior coursework in CDIS and ANTH 1023.

CDIS4213 Introduction to Speech and Hearing Science (Sp) Study of the acoustic structure of oral speech and the auditory skills underlying speech perception. Pre- or Corequisite: MATH 1203 or higher. 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 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 (Sp) 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) 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.

CDIS5152 TBI and Right-Hemisphere Disorders (Irregular) Study of the speech and language disorders commonly resulting from traumatic brain injury and right hemisphere disorders. Prerequisite: CDIS 4253 or equivalent, and graduate standing.

CDIS5163 Seminar in Language Topics (Irregular) 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.

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 resonance, 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.

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 up to 6 hours of degree credit.

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 up to 6 hours of degree credit.

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 up to 18 hours of degree credit.

COUNSELOR EDUCATION (CNED) (M.S., Ph.D.)

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 Program Coordinator
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The Counselor Education (CNED) program at the University of Arkansas is committed to providing quality education and training for individuals pursuing counseling positions in a variety of settings. The M.S. and Ph.D. degrees are offered through the program. The Counselor Education Program's M.S. in School Counseling, M.S. in Mental Health Counseling, and Ph.D. in Counselor Education are accredited by the Council for Accreditation of Counseling and Related Education Programs (CACREP). Common course requirements are specified for each emphasis. General requirements for M.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 licensure as a 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.

Areas of Concentration: Mental health counseling; student affairs and college counseling; school counseling.

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 116). Applicants should first submit an application and official transcripts 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 September 15 for Spring admission and January 15 for Summer/Fall admission.

Requirements for the Master of Science in Counseling Degree:

Required Core Courses (27 hours):

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 5363 Dynamics of Group Counseling

CNED 5513 Counseling and Human Diversity

ESRM 5013 Research Methods in Education

EDFD 5573 Life Span Human Development

Emphasis in Mental Health Counseling requires 60 graduate hours including the core and the following 33 hours:

CNED 5193 Clinical Mental Health Counseling

CNED 5343 Counseling Practicum (100 clock hours in a mental health counseling setting)

CNED 5353 Psychopharmacology

CNED 5373 Ethical and Legal Issues in Counseling

CNED 5383 Crisis Intervention Counseling

CNED 5403 Case Management and Counseling

CNED 574V Community Counseling Internship (6 semester hours; 600 clock hours in a community setting)

CNED 6003 Counseling and Addictions

CNED 6023 Foundations of Marriage and Family Counseling Therapy

CNED 6083 Consultation Theory and Methods

Emphasis in Student Affairs and College Counseling requires 48 graduate hours including the core and the following 21 hours:

CNED 5343 Counseling Practicum (100 hours in a college counseling setting)

CNED 5373 Ethical and Legal Issues in Counseling

CNED 5403 Case Management and Counseling

CNED 574V Counseling Internship (6 semester house; 600 clock hours in a college setting)

HIED 5033 Student Affairs in Higher Education

Emphasis in School Counseling requires 48 graduate hours including the core and the following 21 hours:

CNED 5313 Program Organization and Information Management

CNED 5343 Counseling Practicum (100 clock hours in a school counseling setting)

CNED 5403 Case Management and Counseling

CNED 574V Counseling Internship (6 semester hours; 600 clock hours in an elementary or secondary school setting)

CNED 6083 Consultation Theory and Methods

CNED 6093 Counseling Children and Adolescents

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 September 15 for Spring admission and January 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 and Therapy

CNED 6223 Foundations of Counselor Education and Supervision
 CNED 6343 Cultural Foundations and Counseling
 CNED 6413 Advanced Individual Appraisal
 CNED 6711 Advanced Counseling Practicum
 CNED 674V Clinical Internship/Instructorship/Supervision/Research (9-12 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 6003 Counseling and Addictions
 CNED 6093 Counseling Children and Adolescents
 CNED 699V Seminar

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 committee approval). Six hours of courses must be at the 6000 level.

College of Education Requirements:

Dissertation (listed above), research and statistics (18 semester hours). 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 developed with the guidance and approval of the doctoral advisory committee and are due at the time of the student's oral comprehensive examination.

Counselor Education (CNED)

CNED5193 Clinical Mental Health Counseling (Sp) An introductory study of community counseling. The course content includes information concerning the educational, historical, philosophical, and psychological foundations of community counseling as well as specific traits and skills of professional community counselors. In addition, the course is designed to provide introductory level concepts and skills required for future certification and licensure as counseling professionals. Prerequisite: Graduate student status.

CNED5203 Foundations of the Counseling Profession (Su, 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 (Su) 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 (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 (Su, Fa) Introductory survey and critical analysis of major alternative theoretical perspectives in counseling.

CNED5333 Basic Counseling Techniques (Sp, Fa) Introduction to basic counseling techniques and skills common to multiple theoretical perspectives. Prerequisite: CNED masters student or instructor Permission.

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.

CNED5353 Psychopharmacology (Su) Study of theory, research, & practice issues pertaining to psychopharmacology for non-medical practitioners. Prerequisite: CNED 5203, CNED 5323, CNED 5333.

CNED5363 Dynamics of Group Counseling (Sp, Fa) 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, marital 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 (Su) Examination of human and cultural diver-

sity, 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 (Sp, Fa) (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 up to 6 hours of degree credit.

CNED599V Seminar (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

CNED6003 Counseling and Addictions (Su) A study of behavioral and substance addictions, 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 (Even years, Sp) 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 (Odd years, 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 or masters standing or permission.

CNED6043 Supervision of Counselors (Even years, Fa) 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 up to 18 hours of degree credit.

CNED6073 Research in Counseling (Odd years, Sp) 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 (Odd years, Fa) 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.

CNED6223 Foundations of Counselor Education and Supervision (Odd years, Sp) This course is designed to enhance the professional development and acculturation of doctoral students in order to facilitate their success in professional leadership roles of counselor education, supervision, counseling practice, and research competencies. Prerequisite: CNED Doctoral status or permission.

CNED6343 Cultural Foundations and Counseling (Even years, Fa) To gain learning experiences in pedagogy relevant to multicultural issues and competencies, including social change theory and advocacy action planning. To identify current multicultural issues as they relate to social change theories, ethical and legal considerations, disability, gender, sexuality, social justice, and advocacy models. Prerequisite: CNED or RHAB Doctoral Standing or Permission.

CNED6413 Advanced Individual Appraisal (Odd years, Fa) 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.

CNED6711 Advanced Counseling Practicum (Sp) Supervised counseling practice. A 100-clock hour approved practical counseling experience. Prerequisite: CNED doctoral standing. Permission of CNED faculty and Clinical Coordinator. May be repeated for up to 3 hours of degree credit.

CNED674V Internship (Sp, Su, Fa) (1-18) Supervised field placement (Clinical/Instructorship/Supervision/Research). Prerequisite: CNED doctoral standing, CNED faculty consent and CNED Clinical Coordinator consent. May be repeated for up to 18 hours of degree credit.

CNED699V Seminar (Su) (1-18) Prerequisite: CNED Doctoral standing or permission. May be repeated for up to 18 hours of degree credit.

CNED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy and consent.

HIGHER EDUCATION (HIED) (M.Ed., Ed.D.)

John Murry
 HIED Program Coordinator
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The Higher Education program prepares students for professional competence, leadership, and service in two areas: administration (including student affairs work) and college teaching. 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.

Areas of Study: M.Ed. Program: Student affairs, organization and administration. Ed.D. Program: Administration and faculty leadership.

Admission Prerequisites for Master of Education Program: Formal

admission to the Master's of Education (M.Ed.) degree in Higher Education requires prior admission to the University of Arkansas Graduate School, which requires a separate application process. Admission to the University of Arkansas Graduate School requires a minimum 3.0 cumulative GPA or a 3.0 GPA on the last 60 hours of course work attempted. In addition, admission to the program requires (1) a completed Higher Education Master's program application form; (2) an autobiographical sketch; (3) a current resume; (4) three supporting letters of recommendation; (5) a writing sample demonstrating the applicant's best writing; and (6) an interview with at least one member of the Higher Education faculty. If distance, cost of travel or other unusual circumstances make it difficult or impossible to hold a personal interview, a telephone interview may be substituted.

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.

M.Ed. Program Requirements

1. Completion of a minimum total of 33 graduate semester-hour credits (or 27 plus thesis), including at least 21 hours in higher education.

2. Completion of the following required seven courses in Higher Education:

- HIED 5003 Overview-American Higher Education
- HIED 5033 Student Affairs in Higher Education
- HIED 5043 The Student in Higher Education
- HIED 5083 History and Philosophy of Higher Education
- HIED 5073 Management of Higher Education Institutions
- HIED 5173 Individual and Group Management Skills
- HIED 6653 Legal Aspects of Higher Education

3. For students with no prior full-time administrative experience completion, with adviser approval, at least 3 credit hours of HIED 5643 Internship Seminar in Student Affairs (3 hours)

4. A minimum total of 6 hours of adviser-approved electives to be selected from Higher Education or other relevant areas [may include 600V(6) Master's Thesis].

5. Electives in Higher Education may be selected from the following:
- HIED 5643 Internship Seminar in Student Affairs
 - HIED 574V Internship (limited to 6 hours)
 - HIED 504V Practicum in Higher Education (limited to 6 hours)
 - HIED 5053 The Community-Junior College
 - HIED 605V Independent Study (limited to 6 hours)
 - HIED 6183 Organization Development and Change in Higher Ed
 - HIED 6533 Assessment of Institutional Effectiveness in Higher Education
 - HIED 6663 Finance and Fiscal Management
 - HIED 6683 Governance and Policy Making in Higher Education
 - HIED 699(3) Seminar: Study Abroad
 - HIED 699(3) Seminar: Selected Topics

Other Higher Education courses, designed primarily for doctoral students, with instructor's approval.

Other related areas might include counseling, business, psychology, sociology, communications or other fields of interest to the student.

6. A minimum of 3 hours in research or statistics selected from the following: Either ESRM 5013 Research Methods in Education or ESRM 5393 Statistics in Education and Health Professions.

7. A cumulative grade point average of at least 3.00 on all course work for the degree. No grades below "C" will be accepted for graduate degree credit.

8. Satisfactory performance on a written comprehensive examination.

9. Students enrolled in the Higher Education Program must hold a graduate assistantship or be employed full-time in higher education or a related field (such as an agency; exceptions must be approved by faculty).

Admission Prerequisites for the Doctor of Education Degree: Formal admission to the Doctor of Education (Ed.D.) degree in Higher Education requires (1) prior admission to the University of Arkansas Graduate School, which requires a separate application process; (2) a master's degree or approved equivalent (minimally, 30 hours of post-baccalaureate graduate work completed); (3) a cumulative grade-point average on all graduate work attempted of at least 3.5 and a satisfactory Millers Analogy Test (MAT) score or Graduate Record Examination (GRE) scores, or a cumulative graduate grade-point average of at least 3.25 and one of the following: a Millers Analogy Test (MAT) score of at least 55 (1992 norms) or 418 (2003 norms) or Graduate Record Examination (GRE) scores of at least 450 (verbal reasoning), 534 (quantitative reasoning), and 4.3 (analytical writing); (4) a minimum of three years of successful, relevant professional experience or its equivalent, in an area related to the degree program prior to beginning the degree or five years prior to completing the degree; (5) a completed Higher Education Program Application for Admission Form; (6) a current resumé or vitae; (7) an admissions essay following our format; (8) at least three references (using our forms) (9) a recent professional writing sample; and (10) a personal interview with a Higher Education faculty committee, which by majority vote decides admission. Completed application deadlines are October 15 for Spring admission and March 15 for Fall admission.

Ed.D. Program Requirements: Students must complete a minimum of 96 graduate semester-hour credits (some programs may require more than the minimum of 96 hours), including a minimum of 24 hours of in higher education core courses, and at least 18 dissertation hours.

1. Completion of 12 semester hours of the following Higher Education core courses:

- HIED 5043 The Student in Higher Education
- HIED 5083 History and Philosophy of Higher Education
- HIED 6023 Introduction to the Study of Higher Education
- HIED 6423 Trends, Issues, and Problems in Higher Education

2. Completion of 12 semester-hour core courses in the area of specialization (program option).

- a.) Students whose primary career goals are in administration (including student personnel work) should take the following:
- HIED 6083 Management Skills for Effective Leadership
 - HIED 6093 Leading Change
 - HIED 6653 Legal Aspects of Higher Education
 - HIED 6683 Governance and Policy Making in Higher Education

b.) Students whose primary career goals are in college teaching should take the following:

- HIED 6323 Design and Evaluation of College Teaching
- HIED 6013 The Professoriate: Problems and Issues
- HIED 6343 Strategies for Effective College Teaching

3. Completion of a minimum of 6 additional semester hours of approved electives in Higher Education

- HIED 5033 Student Affairs in Higher Education

- HIED 5053 The Community-Junior College
 HIED 605V Independent Study
 HIED 6173 Individual and Group Management Skills
 HIED 6183 Organization Development and Change in Higher Education
 HIED 6533 Assessment of Institutional Effectiveness in Higher Education
 HIED 6663 Finance and Fiscal Management
 HIED 674V Internship
 HIED 699(3) Seminar — (various topics)
- Completion of 18 semester hours (or approved equivalents) in the area of research and statistics:
 ESRM 6403 Educational Statistics and Data Processing
 Three hours to be selected from the following advanced-level research and statistics courses:
 ESRM 6413 Experimental Design, ESRM 6423 Multiple Regression, ESRM 6533 Qualitative Research, or ESRM 699(3) Seminar: Survey Research Methods and HIED 669(3) Assessment in Higher Education
 - Completion of a minimum of 9 graduate semester hours of approved electives outside Higher Education.
 - For students with no prior full-time administrative or college teaching experience, completion of 3 to 9 hours of HIED 674V Internship.
 - A minimum grade point average of at least 3.25 on all course work presented as part of the degree program. No graduate degree credit will be granted for any course grades below “C.”
 - Satisfactory completion of all requirements governing the written and oral examinations for the candidacy examination, the dissertation, and the final oral dissertation defense.

 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.
- HIED5033 Student Affairs in Higher Education (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.
- HIED5643 Internship Seminar in Student Affairs (Sp)** The Internship Seminar in Student Affairs is designed to give students the opportunity to work in a functional area of Student Affairs. The seminar will meet as a class five times over the semester. May be repeated for up to 6 hours of degree credit.
- 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 in-

terview, 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 in postsecondary 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.

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.

HIED6533 Assessment of Institutional Effectiveness in Higher Education (Sp) The course examines the fundamentals of assessment of learning outcomes and institutional effectiveness and introduces assessment as a tool to inform strategic planning and data-driven decision-making in 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.

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 up to 6 hours of degree credit.

HIED700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

REHABILITATION (RHAB) (M.S., Ph.D.)

Brent Thomas Williams
 Program Coordinator
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In addition to the general program in vocational rehabilitation counseling, two specialty emphasis tracks are offered: rehabilitation job development and job placement; and independent living.

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 both tracks must complete 48 semester hours. 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 tracks. Students may complete an additional 12 hours of course work to qualify for counseling licensure.

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. All students in the vocational rehabilitation program complete a practicum and internship in a vocational rehabilitation program complete a practicum and internship in an independent living center, or community service provider that specializes in independent living.

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 500 on the Verbal and Analytic subsets and a score of at least 5 on the Writing Sample 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

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)

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.

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 Rehabilitation (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.

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.

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.

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 in-depth 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 in-depth examination of theories and techniques related to evaluation of vocational potential and work adjustment of people with disabilities.

RHAB574V Internship (Sp, Su, Fa) (1-9)

RHAB599V Seminar (Sp, Su, Fa) (1-18) May be repeated for up to 18 hours of degree credit.

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 (Odd years, 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 up to 18 hours of degree credit.

RHAB6263 Clinical Supervision of Practicum Students (Su) The study and practice of supervising master's rehabilitation counseling students in a clinical practicum setting. Prerequisite: 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 up to 18 hours of degree credit.

RHAB700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

HUMAN RESOURCE AND WORKFORCE DEVELOPMENT EDUCATION (WDED) (M.Ed., Ed.D.)

Claretha Hughes

Program Coordinator, Human Resource and Workforce Development

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479-575-2047

E-mail: chbanks@uark.edu

M.Ed.: <http://wded.uark.edu/4015.htm>

Ed.D.: <http://wded.uark.edu/4529.htm>

The Human Resource and Workforce Development Education program prepares scholar/practitioners to be educators, managers, and consultants in academic, public, and private settings. This program focuses on human resource and workforce development (HRD) theory and best practices. The core values are excellence, intellectual freedom, integrity, service, learning, diversity and stewardship. The M.Ed. program is a 33-hour non-thesis online program. The Ed.D. program offers a Doctor of Education degree in Human Resource and Workforce Development Education. This program is designed for students who seek leadership careers in education, business, or industry settings. The Ed.D. program is a 96-hour online program with one or two courses which have multiple meetings on campus.

Admission Requirements for the Master of Education Degree Program: All candidates who seek admission to the program must have (1) a minimum grade-point average (GPA) of 3.0 on the last 60 hours of attempted course work prior to the receipt of the baccalaureate degree from a regionally accredited institution; or (2) if the GPA is less than a 3.0 but at least 2.7 on the last 60 credit hours of attempted baccalaureate course work, the applicant may be considered for admission by special consideration, which includes satisfactory scores on the Graduate Record Examination (GRE); or (3) a conferred post-baccalaureate degree (excluding professional degrees) from a regionally accredited institution of higher education.

Requirements for the Master of Education (M.Ed.) Degree: The student's program of study consists of the requirements listed below. Graduation requirements include (1) completing 33 semester hours (no thesis) with a minimum cumulative GPA of 3.0 (six hours may be transferred in but will not be calculated into the GPA); and (2) passing a Capstone Course in the final academic semester.

Required Core for Human Resource and Workforce Development Education – 21 hours

Required Research Courses (6 hours)

ESRM 5013 Research Methods in Education (on-campus students can take ESRM 5393 Statistics in Education and Health Professions)

HRWD 5433 HRD Capstone (includes comprehensive exam)

HRWD Core Courses (27 hours)

Career Development Pillar

HRWD 5113 Foundations of HRWD

HRWD 5123 Career Transitions

HRWD 5133 HRWD Diversity Issues

Organization Development Pillar
 HRWD 5213 Organizational Analysis
 HRWD 5223 Strategic HRD
 HRWD 5233 HRWD Employment, Legal and Ethical Issues
 Training and Development Pillar
 HRWD 5313 Facilitating in the Workplace
 HRWD 5323 INternational HRWD
 Supplemental Courses (3-9 hours)
 HRWD 571V Independent Study
 HRWD 572V Workshop
 HRWD 573V Experiential Learning

Admission Requirements for the Doctor of Education (Ed.D.) Degree

Program: Applicants may obtain detailed instructions for application to the program on the WDED Web site at <http://wded.uark.edu/4529.htm>. The Human Resource and Workforce Development Education faculty considers the following factors important in determining admission to the program:

1. Demonstration of interest in a career in human resource and workforce development education through an interview with the department's admissions committee.
2. Evidence of potential to contribute to the advancement of the field of workforce development education through research and professional leadership.
3. Previous work experience.
4. Commitment to a blended delivery program.
5. Graduate grade point average
6. Old Graduate Record Examination Score: 1000 combined scores of verbal and quantitative, and a 4.0 on analytical writing.
7. New Graduate Record Examination Score: Verbal – 153; Quantitative – 150; and a 4.0 on analytical writing. Scores are valid for five years.

In addition to meeting University requirements for admission to the Graduate School (<http://www.uark.edu/recruit/admission/index.html>), applicants must apply to the WDED program by submitting an application for admission specific to the Ed.D program in WDED, an autobiographical sketch, and a resume.

Requirements for the Ed.D. Degree in Human Resource and Workforce Development Education: Candidates for the Doctor of Education Degree in Human Resource and Workforce Development Education must complete 96 semester hours of graduate study acceptable to their advisory committee. Master's courses - 30 to 45 hours - may be used to fulfill some of the requirements below.

Human Resource and Workforce Development Education (96 hours):

Research and Statistics – 36 hours (including 18 dissertation hours)

ESRM 5013 Research Methods in Education, or approved equivalent

ESRM 6403 Educational Statistics and Data Processing

HRWD 6323 Qualitative Research Design and Analysis

HRWD 6333 Quantitative Research Design and Analysis

HRWD 6343 HRWD Dissertation Seminar

HRWD 700V Dissertation

Human Resource and Workforce Development Education Core – 27 hours:

Career Development Pillar

HRWD 5113 Foundations of Human Resource Development

HRWD 6423 HRWD Practicum (Training or Teaching or Research)

Organizational Pillar

HRWD 6533 HRWD Ethical and Legal Issues

Training and Development Pillar

HRWD 6613 Learning and Teaching Theories

Electives

HRWD 6713 HRWD Curriculum Design

HRWD 6723 Entrepreneurial Development

HRWD 6743 HRWD Trends & Issues

Any University of Arkansas HRWD master course excluding the Supplemental Courses

Or other courses approved by committee

Workforce Development (WDED)

WDED5213 Foundations of Adult Education (Sp) History of the adult education movement in America, characteristics, interests, abilities, and educational needs of adults; the role of the public school in adult education; methods and techniques of conducting adult classes.

WDED5223 Principles of ABE/GED/ESL (Su) An introductory course to teaching adults at the Adult Basic Education (ABE), General Education Development (GED-High School Equivalency), and English as a Second Language (ESL) levels. Will address instructional needs assessment, curriculum development and evaluation, and techniques of teaching basic skills in various settings including public schools, vocational-technical schools, technical institutes, technical colleges, community organizations, and the workplace.

WDED5233 Teaching Disadvantaged Adults (Su) A survey of the diversity of adult learners comprising that population described as educationally disadvantaged. Consideration given to the various physical, mental, social, and economic factors which contribute to the uniqueness of this body of individual differing abilities.

WDED5433 School-To-Workforce (Su) This course is designed to provide information on the role of the school in workforce development and to introduce a teacher to the skills desired in a seamless educational curriculum model.

WDED5513 Principles of Adult Learning (Fa) The learner in adult education programs is examined from young adulthood to death. Emphasis is given to understanding the effect this knowledge has on the teaching-learning process in adult education and to how adult education programs are designed to serve the uniqueness demanded by adult learning situations.

WDED5563 Introduction to Distance Learning (Sp) This course is designed to build a knowledge base about distance learning environments, especially online learning. This course emphasizes interaction among pedagogical models, instructional models, and learning technologies. The content is contextualized within higher learning, k-12 school, and corporate training.

WDED5583 Internship (Sp, Su, Fa) Site-based activity designed for those seeking Adult Education Licensure. Pre- or Corequisite: WDED 5513. Prerequisite: WDED 5223.

WDED6113 Nontraditional Student (Irregular) An overview of activities that could ultimately promote greater access and success for adult learners with higher education and/or advanced training.

WDED6123 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.

WDED6213 Training in the Workplace (Su) 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.

WDED6223 Organization Development (Sp) This course teaches development of organization activities that intervene in the interaction of people systems to increase the effectiveness of using a variety of applied behavioral sciences. It includes the dynamics of organizations, the genesis of organizational theory and evolution of organizational dynamics, including examination of system structure, chaos theory, group dynamics and interaction, leadership theories, diversity issues impacting organizations, and techniques of change agent intervention.

WDED6233 Learning Organization (Fa) This course emphasizes the theory and practice of learning organizations, especially the processes that facilitate individual and group learning.

WDED6513 Leadership Models and Concepts (Sp, Su) This doctoral course concentrates on using commonly accepted principles of leadership to develop skills needed in workforce development education settings.

WDED6523 Curriculum Design (Sp, Su, Fa) Determining principles of curriculum development, implementation, and evaluation with emphasis in adult and human resource development education.

WDED6533 Adult Literacy (Su) This course is based upon theoretical models of adult learning and teaching methods. The course addresses the historical background of literacy programs, evolution of teaching techniques, social economic and community, needs, curriculum development and evaluation, and techniques of teaching adult literacy in various settings, including public schools, vocational and technical schools, technical institutes, technical colleges, community organizations, and the workplace.

WDED6543 Program Planning and Evaluation in Workforce Development (Sp) Emphasis is given to understanding the theoretical foundation upon which the programming and evaluation processes are predicated, developing a theoretical mode, and acquiring the conceptual tools necessary for analyzing the programming process in any workforce development education organization.

SECONDARY EDUCATION (SEED)

See listing in the Department of Curriculum and Instruction, page 90.

SECONDARY MATHEMATICS

See Mathematical Sciences, page 125.

SOCIAL WORK, SCHOOL OF (SCWK)

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- Professors Schriver, Shobe
- Associate Professors Christy, Murphy-Erby, Stauss
- Research Associate Professor Hurd
- Assistant Professors Ferguson, Koh
- Clinical Associate Professor Greer, House
- Clinical Assistant Professors Burcham, Collie (S.)
- Visiting Assistant Professor Collie (M.)

Degree Conferred:

Master of Social Work (M.S.W.)

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 M.S.W. program is accredited by the Council on Social Work Education (CSWE).

Areas of Study: The University of Arkansas M.S.W. program offers a multi-system life-course (MSLC) specialization. The multi-system life-course 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: Healthy aging; 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 asset development; children and families.

Admission Requirements: Admission to the University of Arkansas Graduate School as well as admission to the School of Social Work M.S.W. program is required. Admission requirements for the M.S.W. program include: a baccalaureate degree with a liberal arts perspective from an accredited college or university (official transcripts must be provided); 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; a social needs paper that discusses a current social need that is of concern and interest to you; three professional reference letters (faculty, employers, supervisors); a basic statistics course; and computer literacy

demonstrated through prior course work. Applicants with a GPA between 2.5-2.99 for the last 60 hours of their most recent undergraduate degree are required to complete the Graduate Record Examination (GRE) or Millers Analogies Test (MAT) and to submit GRE/MAT scores to the Graduate School. 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 available for students without a baccalaureate degree from a program accredited by the Council on Social Work Education (CSWE). Students in the two-year option must successfully complete a total of 63 credit hours. The following are required Foundation courses: SCWK 4073, 4093, 4103, 4153, 4333, 4343, 4733, 5003, 5013, 5412, 5434. The following are required Advanced courses: SCWK 5073, 6000L, 6003, 6013, 6073, 6442, 6444, 6452, and 6454.

Three-year Extended Program Option: This option is available for students without a baccalaureate degree from a program accredited by the Council on Social Work Education (CSWE). Students in the three-year extended program must successfully complete a total of 63 credit hours. The following are required foundation courses: SCWK 4073, 4093, 4103, 4153, 4333, 4343, 4733, 5003, 5013, 5412, 5434. The following are required advanced courses: SCWK 5073, 6000L, 6003, 6013, 6073, 6442, 6444, 6452, and 6454. Please note that the three-year extended program accepts students every other year (e.g. Fall 2009, 2011, 2013, 2015, etc.)

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 39 credit hours including SCWK 5013, 5442, 5444, and the advanced course work listed above for the two- and three-year options.

Electives:* Each student is required to successfully complete two electives (6 credit hours). Electives are chosen in consultation with and with approval from the student's major faculty adviser. Students may enroll in electives from outside the School of Social Work, with faculty adviser approval. Graduate social work electives include: SCWK 5143, 5153, 5163, 5173, 5183, 5193, 5213, 5253, and 5343.

* Elective topics often change from semester to semester based on faculty expertise and student interest. Therefore, it is not possible to guarantee specific electives.

Other Requirements: M.S.W. students are required to complete a capstone paper and presentation. The capstone project is a research experience in the area of practice/program evaluation, guided and evaluated by a panel of faculty and senior social work practitioners from the community. Students may also choose, with faculty approval, to complete a thesis. The thesis option is guided by the student's thesis committee, resulting in a final paper and oral defense. Both options are completed in conjunction with the three-hour Research and Technology course.

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 credit.

SCWK4073 Social Work Research and Technology I (Sp, Fa) 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. Pre- or Corequisite: One of the following: STAT 2303, SOCI 3303/3301L, PSYC 2013, or EDFD 2403. Prerequisite: SCWK 4093 and SCWK 4153.

SCWK4093 Human Behavior and the Social Environment I (Sp, 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: COMM 1313, PSYC 2013, SOCI 2133, SCWK 2133, and SCWK 3193 and (BIOL 1543 and BIOL 1541L, or ANTH 1013 and ANTH 1011L).

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 hu-

man 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 and SCWK 4153.

SCWK4153 Social Welfare Policy (Sp, 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: COMM 1313, PLSC 2003, SCWK 2133, and SCWK 3193.

SCWK4183 Social Work With Elders (Sp, Fa) Survey of theories of gerontology, service programs and unmet needs of the aging citizen.

SCWK4233 Seminar: Children and Family Services (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 4103. Prerequisite: SCWK 4093 and SCWK 4153.

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. Corequisite: SCWK 4733. Prerequisite: SCWK 4103 and SCWK 4333.

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 Bridge Course: Evidenced Based Social Work (Su) This course prepares MSW students to transition from the foundation course to the advanced concentration courses. Students will become familiar with the mission and conceptual framework underlying the advanced concentration and develop beginning knowledge of traditional and alternative approaches to client system assessment. Prerequisite: Admission into the advanced standing MSW program or completion of foundation courses.

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 (Irregular) 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.

SCWK5253 Spirituality 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.

SCWK596V Independent Study (Sp, Su, Fa) (1-6) Independent study designed to meet the particular needs of individual graduate students. May be repeated for up to 6 hours of degree credit.

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 Advanced Practice I Using the Multi-System Life Course Perspective (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.

SCWK6013 Advanced Practice II Using the Multi-System Life Course Perspective (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: Lab component and 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 (SOCl)

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- Distinguished Professor Smith
- University Professors Morgan, Schwab
- Professors Fitzpatrick, Gaber (S.), Holyfield, Zajicek
- Associate Professors Adams, Bradley, Engen, Engen, Koski, Worden, Yang
- Assistant Professors Bustamante, Harris, Gruenewald, Morimoto
- Visiting Assistant Professor Shields
- Instructor Thompson

Degree Conferred:
M.A. in Sociology (SOCl)

Areas of Concentration: General sociology and criminology.

Primary Areas of Faculty Research: Collective behavior; social movements and terrorism; community studies; criminology and criminal justice; democratic participation; family and policy; human ecology; institutional change; qualitative methods; quantitative methods; race/class/gender inequality; social network analysis; sociology of culture; sociology of emotions; sociology of religion; symbolic interaction; urban sociology.

Application Requirements for the MA in Sociology Program: Applicants for graduate studies in sociology must be admitted to the Graduate School and must also submit the following: 1) at least two letters of recommendation from people who can judge the applicant's academic potential as a graduate student; 2) a sample of written academic work (i.e., a research paper); 3) a one page statement in which the applicant discusses the educational objectives sought by entering our graduate program; 4) satisfactory GRE scores.

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. SOCl 3303 (or an approved equivalent), SOCl 3313 and SOCl 4023 (or an approved equivalent) are required to eliminate deficiencies. Additionally, students applying to the criminology concentration must show prior undergraduate work in introductory criminal justice or criminology. SOCl/CMJS 3023 (or an approved equivalent) is required to eliminate deficiencies for students pursuing the criminology concentration. 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 32 hours.)

Core requirements:
SOCl 5001 Proseminar
SOCl 5253 Classical Social Theory
SOCl 5311L Applied Data Analysis Lab

SOCl 5313 Applied Data Analysis
SOCl 5013 Advanced Social Research, or
SOCl 5083 Methods of Field Research

M.A. in Sociology with a concentration in General Sociology: In addition to meeting all of the core requirements outlined above, students wishing to pursue a master's degree in Sociology with a concentration in general sociology must complete the following courses:

Required Courses

SOCl 5263 Contemporary Social Theory
SOCl 5083 Applied Qualitative Research

Restricted Electives

Choose two courses from the following list:

SOCl 503V Special Topics: Organizations in Society
SOCl 5043 Public Policy Children and Families
SOCl 5113 Seminar in Social Inequality
SOCl 5133 Community
SOCl 5153 Sociological Perspectives on Social Psychology
SOCl 5233 Theories of Deviance

M.A. in Sociology with a concentration in Criminology: In addition to meeting all of the core requirements outlined above, students wishing to pursue a master's degree in Sociology with a concentration in criminology must complete the following courses:

Required Course

SOCl 5413 Seminar in Criminological Theory

Restricted Electives

Pick two courses from the following list:

SOCl 5423 Research in Criminology
SOCl 5433 Victimization
SOCl 5443 Seminar in Terrorism
SOCl 5453 Social Control
SOCl 5463 White Collar Crime
SOCl 5473 Crime and Community

In addition to these common core courses, the courses required in a specific concentration, and the six hours of specialization-specific restricted electives, the student must take sufficient hours of electives to reach 32 semester hours total. The Department retains the right to make exceptions to the list of concentration-specific electives. Such exceptions must be approved by the Graduate Committee and authorized in writing by the Graduate Director. 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. 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 26 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 32 hours of course work. Students must select an area of study 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 study.

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.

SOCI4013 Special Topics in Sociology (Sp, Su, Fa) Designed to cover specialized topics not usually presented in depth in regular courses. Prerequisite: SOCI 2013. May be repeated for up to 6 hours of degree credit.

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.

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 (Irregular) The origin, continuity, problems, and personalities, of the Black American community and its contributions to national and international life. Prerequisite: SOCI 2013.

SOCI4133 The Family (Irregular) 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.

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. Prerequisite: Junior or above standing. (Same as RSOC 4603)

SOCI5001 Proseminar (Fa) An informal forum for graduate students and faculty to present and discuss ongoing research interests as well as the current state of the discipline. Prerequisite: Graduate standing.

SOCI500V Advanced Problems in Sociology (Sp, Su, Fa) (1-3) 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 3301L, SOCI 3303, and SOCI 3313 or instructor consent.

SOCI503V Special Topics (Irregular) (1-6) Designed to cover specialized topics not usually presented in depth in regular courses. Prerequisite: Graduate Standing. May be repeated for up to 6 hours of degree credit.

SOCI5043 Public Policy, Children and Families (Sp) 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.

SOCI5083 Applied Qualitative Research (Fa) 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: Graduate standing.

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.

SOCI5233 Theories of Deviance (Irregular) 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 (Fa) 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. Prerequisite: SOCI 3303 and SOCI 3301L or an equivalent course in statistics.

SOCI5313 Applied Data Analysis (Sp, Fa) 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 and SOCI 3301L and SOCI 5013. Familiarity with statistical computer programs is assumed.

SOCI5413 Seminar in Criminological Theory (Sp) An examination of the causation of crime, focusing primarily on sociological theories. Prerequisite: Graduate standing.

SOCI5423 Research in Criminology (Irregular) Examination of empirical research in criminology, focusing on methodological problems, strategies, and findings. Prerequisite: Graduate standing.

SOCI5433 Victimization (Irregular) Study of the causes, correlates, and consequences of victimization, focusing on theories of victimization and the role of victims in the criminal justice system. Prerequisite: Graduate standing.

SOCI5443 Seminar in Terrorism (Irregular) Examination of the causes and consequences of terrorism. Prerequisite: Graduate standing.

SOCI5453 Social Control (Irregular) Study of sociological theories and research on formal social control, primarily institutional responses to criminal behavior. Prerequisite: Graduate standing.

SOCI5463 White Collar Crime (Irregular) Study of the nature of white collar, professional, and corporate crime.

Prerequisite: Graduate standing.

SOCI5503 Research Internship (Sp, Fa) Supervised research experience in field setting.

Prerequisite: Graduate standing.

SOCI600V Master's Thesis (Sp, Su, Fa) (1-6)

SPACE AND PLANETARY SCIENCES (SPAC)

William Oliver

Director

MUSE 202

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John Dixon

Deputy Director and Graduate Coordinator

Ozark 140

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Biological Sciences Faculty:

- Associate Professors Ivey, Kral

Chemistry/Biochemistry Faculty:

- University Professor Sears

- Distinguished Professor Gawley

- Professor Davis

Chemical Engineering Faculty:

- Professor Ulrich

- Research Assistant Professor Chevrier

Electrical Engineering Faculty:

- Professor Mantooth

Geosciences Faculty:

- Professors Boss, Dixon

- Associate Professor Tullis

- Assistant Professor Teng

Mechanical Engineering Faculty:

- Associate Professor Roe

- Assistant Professor Huang

Physics Faculty:

- Professor Lacy

- Associate Professor Oliver

- Assistant Professor 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, and Ph.D. degree in Biology.

The program provides advanced course work and research experience for persons seeking a career in the academic, government, private, or military sectors of space and planetary sciences or associated technologies.

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, and ice moons – particularly Titan – and surface processes.

Admission to Degree Program: Students wishing to apply for admission to the graduate degrees in space and planetary sciences should contact the Center's graduate coordinator at jcdixon@uark.edu. Applicants should prepare to have transcripts, two letters of recommendation, and a statement of

purpose sent to the Center. Applicants are encouraged to submit scores from the Graduate Record Examination, including the writing score.

Basic Requirements for the Master's Degree: At least 24 semester hours of courses plus at least six hours of SPAC 600V are required for a total of at least 30 hours beyond the baccalaureate degree. Students are required to take the following courses:

Non-core courses – must take both (2 hours)

SPAC 5111L Space and Planetary Laboratory

SPAC 5211 Proseminar

Core courses – must take at least three of the following five (9 hours)

SPAC 5033 Planetary Systems

SPAC 5313 Planetary Atmospheres

SPAC 5413 Planetary Geology

SPAC 5513 Biochemical Evolution or SPAC 5553 Astrobiology

SPAC 5613 Astronautics

Space and Planetary Electives (see list below) – must take at least three courses (9 hours). Substitutions may be made with the approval of the committee.

Other electives plus Seminar – must take at least four hours

SPAC 5161 Seminar (must take every semester)

Thesis – must take at least six hours

SPAC 600V

NOTE: The student's committee consists of at least four faculty members; at least three of these must be from the space center faculty, drawn from three different departments, and these must include the graduate advisor and the chair of the committee. One member of the committee should be from outside of the space center.

Every student must register for a minimum of one credit hour of SPAC 600V or 700V in each term during which the student is away from campus and doing thesis or dissertation research. The number of 4000-level courses allowed in a program is limited to two and committee approval is required.

Requirements for the Doctor of Philosophy Degree: Students are required to take a minimum of 72 hours beyond the baccalaureate degree to include a minimum 34 hours of required course work and 18 hours of SPAC 700V. Course requirements are given below.

Non-core courses – must take all three (5 hours)

SPAC 5111L Space and Planetary Laboratory

SPAC 5211 Proseminar

SPAC 5123 Internship

Core courses – must take at least four of the following five (12 hours)

SPAC 5033 Planetary Systems

SPAC 5313 Planetary Atmospheres

SPAC 5413 Planetary Geology

SPAC 5513 Biochemical Evolution or

SPAC 5553 Astrobiology

SPAC 5613 Astronautics

Space and Planetary Electives (see list below) – must take at least three courses (9 hours)

Substitutions may be made with the approval of the committee

Other electives plus Seminar – must take at least eight hours

SPAC 5161 Seminar (must take every semester)

Dissertation – must take at least 18 hours

SPAC 700V

Space and Planetary Electives

Note: Other courses may count as electives with the approval of the student's research adviser and committee. No more than two

4000-level courses may be counted toward the Ph.D. degree.

Planetary Astronomy:

ASTR 4013/5013 Astrophysics

GEOL 4433 Geophysics

CHEM 5263 Nuclear Chemistry

CHEM 5273 Cosmochemistry

PHYS 5513 Atomic and Molecular Physics

Planetary Geology:

GEOL 4413 Principles of Remote Sensing

GEOL 5123 Stratigraphic Principles and Practice

GEOL 5423 Remote Sensing of Natural Resources

GEOL 560V Non-traditional Isotope Geochemistry

Planetary Atmospheres:

GEOG 4353 Elements of Weather

GEOG 4363 Climatology

GEOG/ENDY 5113 Global Change

ENDY 5063 Paleoclimatology

Origin and Evolution of Life:

BIOL 4233 Genomics and Bioinformatics

BIOL 4263 Cell Physiology

BIOL 4353 Ecological Genetics

BIOL 5463 Physiological Ecology

CHEM 5813 Biochemistry I

CHEM 5843 Biochemistry II

Astronautics and Orbital Mechanics:

CSCE 5043 Advanced Artificial Intelligence

MEEG 4233 Electromechanical Systems

MEEG 4433 Aerospace Propulsion

MEEG 5273 Electronic Packaging

Additional Requirements: Students are required to complete a thesis or dissertation describing original research work in the space and planetary sciences that must be presented to and successfully defended before their committee. In addition, Ph.D. students must pass a candidacy examination.

The Ph.D. 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 5033/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) an oral defense of the thesis before the committee. Part (1) will be assigned six weeks before the candidacy defense and shall be presented to the committee two weeks before that 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. The committee will judge the examination as pass/fail and in the case of failure – and at the discretion of the committee – a second attempt to pass the qualifying examination is permitted within a period of time determined by the committee.

Space and Planetary Sciences (SPAC)

SPAC5033 Planetary Systems (Odd years, 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.

SPAC5111L Space and Planetary Lab (Fa) 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 (Sp, Fa) 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.

SPAC5161 Seminar (Sp, Fa) 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.

SPAC5211 SPAC Proseminar (Sp) Introductory course consisting of discourses and case studies in ethics, communications and public policy in the administration of space and planetary sciences. Prerequisite: Admission to program or instructor consent.

SPAC5313 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, and comparative planetology of atmospheres. (Same as CHEG 5313)

SPAC5413 Planetary Geology (Even years, Sp) 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 (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, and eukaryotic, novel metabolic reshaping of the environment, life being reshaped by the environment, molecular data, and evolution. Prerequisite: CHEM 5813.

SPAC5553 Astrobiology (Even years, Sp) 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. (Same as BIOL 5553)

SPAC5613 Astronautics (Irregular) Study of spacecraft design and operations. Prerequisite: Admission to program or instructor consent.

SPAC600V Master's Thesis (Sp, Su, Fa) (1-10)

SPAC700V Doctoral Dissertation (Sp, Su, Fa) (1-18)

SPANISH

See World Languages, Literatures, and Cultures, page 164.

SPECIAL EDUCATION (SPED)

See the listing in the Department of Curriculum and Instruction, page 92.

STATISTICS (STAT)

Chaim Goodman-Strauss
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- Professor Gbur
- Associate Professors Mauromoustakos, Meaux, Petris, Song
- Assistant Professor Han
- Research Associate 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 Area of Study: 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. MATH 3083 and MATH 4513 or MATH 3423 (or their equivalent) are prerequisites and otherwise will be considered as deficiencies.

Biometry Area of Study: 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 Area of Study: A candidate must complete a minimum of 30 graduate credits that must include the following: STAT 4001L and STAT 4003 (or ESRM 6403), STAT 4373 (or ESRM 6413), STAT 5103, STAT 5113, STAT 5313, STAT 5333, and STAT 5353, ESRM 6653, and 6 hours of ESRM 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.

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 Introduction to Probability Theory (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 and graduate standing in mathematics or statistics, or departmental consent.

STAT5113 Statistical Inference (Sp) Statistical theory of estimation and testing hypothesis. Prerequisite: STAT 5103 and graduate standing in mathematics or statistics, or departmental consent.

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. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

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, and graduate standing in mathematics or statistics, or departmental consent.

STAT5343 Stochastic Processes (Sp, Su, Fa) Markov chains, branching processes, birth-death processes, queuing theory with application. Prerequisite: STAT 5103, and graduate standing in mathematics or statistics, or departmental consent.

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, and graduate standing in mathematics or statistics, or departmental consent.

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, and graduate standing in mathematics or statistics, or departmental consent.

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, and graduate standing in mathematics or statistics, or departmental consent.

STAT550V Statistical Consulting (Sp, Su, Fa) (1-3) Designed to give students a statistical consulting practicum. Students meet with clients, analyze data and prepare

reports for the clients. May be repeated for up to 6 hours of degree credit.
STAT610V Research in Statistics (Irregular) (1-4) Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.
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. May be repeated for credit. Prerequisite: Graduate standing in mathematics or statistics, or departmental consent.

SUSTAINABILITY (SUST)

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Sustainability Curriculum Steering Committee

- Stephen Boss, co-director, Geosciences
- Tahar Messadi, co-director, Architecture
- Myria Allen, Communication
- Gregory Benton, Recreation and Sports Management
- Kevin Fitzpatrick, Sociology and Criminal Justice
- Carol Gattis, Honors College
- Jon Johnson, Management
- Kim LaScola Needy, Industrial Engineering
- Marty Matlock, Biological and Agricultural Engineering
- Harrison Pittman, Agricultural Law
- Jennie Popp, Agricultural Economics and Agribusiness
- Curt Rom, Horticulture

Graduate Certificate Offered:

Sustainability (non-degree)

The Graduate Certificate in Sustainability is interdisciplinary, drawing from faculty and course work across all colleges of the University of Arkansas. The graduate certificate is accessible to all students admitted to the Graduate School, both degree-seeking and non-degree seeking, who wish to pursue advanced study in Sustainability. The purpose of the Graduate Certificate in Sustainability is to provide functional graduate-level knowledge and skills related to the emerging discipline of Sustainability organized around four thematic areas reflecting strength in scholarship of University of Arkansas academic colleges: Sustainability of Social Systems, Sustainability of Natural Systems, Sustainability of Built Systems, and Sustainability of Managed Systems. Students who complete the graduate certificate in Sustainability will be expected to:

1. Articulate commonly accepted definitions of sustainability and discuss various nuances among those definitions as well as engage in analytical thinking to enhance sustainability measures;
2. Address real-world problems of sustainability to reinforce their professional interests.
3. Have an understanding of the interdisciplinary nature of sustainability issues, particularly as they pertain to the thematic areas of

- knowledge addressed by the graduate certificate (sustainability of natural systems, sustainability of managed systems, sustainability of built systems, and sustainability of human social systems);
4. Be conversant regarding acquisition and analysis of data pertinent to measuring sustainability;
 5. Communicate orally, and in writing organized thoughts defining sustainability measures and technical aspects of sustainability;
 6. Identify potential strategies to address sustainability issues using appropriate analytical methods and data and provide results of analyses of data using novel sustainability metrics and indicators;
 7. Make recommendations, based on data analysis and interpretation, to advance sustainability of individuals or institutions.
 8. Develop methods, techniques and tools for implementing sustainability initiatives.

Required Courses

Students must earn a grade of “B” or better for all courses used to fulfill requirements of the Graduate Certificate in Sustainability.

	Hours
WCOB 5023 Sustainability; Required course for the Graduate Certificate	3
Elective courses with sustainability focus selected from a broad menu of offerings in four thematic areas:	12
Sustainability of Social Systems	
Sustainability of Natural Systems	
Sustainability of Built Systems	
Sustainability of Managed Systems	

Elective courses must be completed in at least two thematic areas. In addition, nine of these 12 hours must be in courses numbered 5000 or above.

A complete list of elective courses may be found on our website: <http://sust.uark.edu>.

VOCATIONAL EDUCATION (VOED)

See Workforce Development Education in the Department of Rehabilitation, Human Resources and Communication Disorders, page 157.

WORKFORCE DEVELOPMENT EDUCATION (WDED)

See the listing in the Department of Rehabilitation, Human Resources and Communication Disorders, page 157.

**WORLD LANGUAGES, LITERATURES, AND CULTURES (WLLC)
 FRENCH–GERMAN–SPANISH**

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<http://www.uark.edu/depts/flaninfo.html/>

- Professors Haydar, Levine, Pritchett, Restrepo
- Associate Professors Arenberg, Bell, Christiansen, Comfort, Condray, Fredrick, Fukushima, Jones, Rozier, Ruiz, Turner, Villalobos
- Assistant Professors Billings, Hoyer, Pappas, Puente

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 World Languages, Literatures, and Cultures 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.

The Master of Arts Degree in German: The Master of Arts degree in German offers course work related to the greater German-speaking world, including Germany, Austria, and Switzerland. The program offers a traditional, canon-centered degree in literary history. Students concentrate primarily on courses investigating literary epochs and particular genres and take occasional courses in cultural studies; all courses are focused on literary analysis and research. Graduates of the program generally continue study at the doctoral level at other institutions or complete alternative licensure or the M.A.T. to teach at the secondary level. Doctoral training in cultural studies and translation is also offered in conjunction with the Comparative Literature and Cultural Studies Program.

Requirements for the Master of Arts Degree in German: 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 written and oral examinations. Detailed program descriptions, including reading lists and examination procedures, are available from the department.

The Master of Arts Degree in French offers course work related to the literary and cultural histories of the greater Francophone world, focusing on France. The program provides advanced preparation in literary analysis and research and offers training for teaching French at the college level, including the most recent technological techniques in teaching foreign languages. French graduates receive a solid preparation to pursue a Ph.D. or to teach at the college or secondary levels. Our comprehensive curriculum enables students to pursue

careers in education, government, international organizations and other business opportunities either abroad or within the United States. In conjunction with the Comparative Literature and Cultural Studies program (CLCS), the program contributes to the Master's and Ph.D. programs for students working in either Francophone literature, translation, French literature or French cultural studies.

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.

The Master of Arts Degree in Spanish: The Master of Arts degree in Spanish offers course work related to the literary and cultural histories of the greater Hispanic world, including Spain, Latin America and U.S. Latino/a literature. The program provides advanced preparation in literary analysis and research and offers training for teaching Spanish at the college level. Spanish program graduates receive a solid preparation to pursue a Ph.D. or to teach at the college or secondary levels. Its comprehensive curriculum also provides a sound base for a career in education, government, international organizations, or the social services. In conjunction with the Comparative Literature and Cultural Studies Program, the program offers doctoral training in interdisciplinary Hispanic studies, cultural studies, and translation.

Requirements for the Master of Arts Degree in Spanish: Aside from deficiencies, a minimum of 36 hours of graduate course work is required for the degree. All students must take a research seminar (SPAN 5703) and present a research paper meeting professional research methods and standards. Each candidate must pass a comprehensive examination covering course work and reading lists on five historical periods of the Hispanic world, including two periods from each tradition (Latin American and Spain) and at least two periods before 1900. The periods of concentration are Colonial, 19th century, 20th century, and U.S. Latino/a for Latin America, and Medieval, Golden Age, 19th century, and 20th century for Spain. 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.

World Languages, Literatures and Cultures (WLLC)

WLLC4023 Language, Culture and Web 2.0 Technologies (Sp) This course provides senior level undergraduate and graduate students with innovative ways to teach and communicate through the use of Web 2.0 technologies as applied to second languages. Topics of discussion include instructional systems design, Web 2.0 technologies (blogs, wikis, Facebook, and other interactive tools), presentation technologies, online facilitation, and effective utilization of technological tools in language and culture courses. Prerequisite: Senior standing.

WLLC4023H Honors Language, Culture and Web 2.0 Technologies (Sp) This course provides senior level undergraduate and graduate students with innovative ways to teach and communicate through the use of Web 2.0 technologies as applied to second languages. Topics of discussion include instructional systems design, Web 2.0 technologies (blogs, wikis, Facebook, and other interactive tools), presentation technologies, online facilitation, and effective utilization of technological tools in language and culture courses. Prerequisite: Senior standing.

WLLC4033 Language, Culture and Video Development (Irregular) This course provides senior level 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, videotaping, editing and development for internet and DVD delivery, and effective utilization of video in teaching and communication. Prerequisite: Senior standing.

WLLC4033H Honors Language, Culture and Video Development (Irregular) This course provides senior level 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, videotaping, editing and development for internet and DVD delivery, and effective utilization of video in teaching and communication. Prerequisite: Senior standing.

WLLC504V 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. (Same as ENGL 5043)

WLLC5063 Teaching Foreign Languages on the College Level (Irregular) Focus on basic methodological concepts and their practical application to college foreign language instruction.

WLLC5463 Descriptive Linguistics (Fa) A scientific study of language with primary emphasis on modern linguistic theory and analysis. Topics include phonology, morphology, syntax, semantics, language acquisition, and historical development of world languages. (Same as ANTH 5473, COMM 5463, ENGL 5463)

WLLC575V Special Investigations (Irregular) (1-6) May be repeated for up to 6 hours of degree credit.

Arabic (ARAB)

ARAB470V Special Topics (Irregular) (1-6) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for credit.

Middle Eastern Studies (MEST)

MEST4003 Middle East Studies Colloquium (Sp) An interdepartmental colloquium with an annual change in subject required of all students in the Middle East studies program. Prerequisite: Sophomore standing. May be repeated for up to 6 hours of degree credit.

European Studies (EUST)

EUST470V Special Topics (Irregular) (1-6) An examination of pertinent issues in Europe. May be repeated for credit.

French (FREN)

FREN4003 French Grammar and Composition (Fa) Prerequisite: FREN 3003 or FREN 3103.

FREN4033 French for Oral Proficiency (Sp) Three hours per week of conversation practice for the advanced undergraduate. Prerequisite: FREN 3003 or FREN 3103.

FREN4113 Special Themes in French (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. May be repeated for up to 3 hours of degree credit.

FREN4213 French Civilization (Sp) Prerequisite: FREN 3113.

FREN4223 Survey of French Literature I (Irregular) A survey of French literature, its forms and themes from the medieval period through the 18th century. Prerequisite: FREN 3113.

FREN4233 Survey of French Literature II (Irregular) A survey of French literature, its forms and themes in the 19th and 20th centuries. Prerequisite: FREN 3113.

FREN4333 Business French (Odd years, Sp) 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 or FREN 3103.

FREN5003 French Grammar and Phonetics (Irregular) Systematic review of principles of French grammar and syntax; comprehensive presentation of French phonetics.

FREN5033 Advanced French Conversation (Irregular) This course will provide a 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.

FREN5333 Old French Literature (Irregular) An intensive study of French Medieval Literature from the Chansons de Geste to Villon, including an in-depth analysis of the genres and their evolution, and of the major authors of the times.

FREN5353 Survey of French Poetry (Irregular) A comprehensive study of French poetry from the Middle Ages to the twentieth century, focusing on close readings of individual poems. This course will cover literary movements and trends of the periods and presents the terminology required to do explication de texte.

FREN5433 French 16th-Century Literature (Irregular) A survey of representative writers of the sixteenth century.

FREN5543 French 17th-Century Literature (Irregular) A survey of representative writers of the seventeenth century.

FREN5663 French Short Story (Irregular) An introduction to the French short story, focusing on close readings of a variety of contes and nouvelles from the Middle Ages through the twenty-first 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 up to 6 hours of degree credit.

FREN575V Special Investigations (Irregular) (1-6) May be repeated for credit.

FREN5773 Survey of Francophone Literature (Irregular) A survey of representative texts in the field of sub-Saharan and North African literature concentrating on post-colonial novels using contemporary critical approaches.

FREN5783 The French Nineteenth-Century Novel (Irregular)

FREN5813 French 20th-Century Theatre (Irregular)

FREN5833 French 20th-Century Novel (Irregular)

German (GERM)

GERM4013 Germany and the Holocaust: The Significance of the Holocaust in Differentiated Contexts (Irregular) Taught in English. Topics covering the role of the Holocaust in German history, culture, art, language and German Studies. Equal emphasis will be placed on historical competence and philosophical/theoretical inquiry, addressed from a variety of media and primary and secondary sources. May be repeated for up to 6 hours of degree credit.

GERM4043 German Cinema (Irregular) Presents a range of German films in cultural-historical context; vocabulary and structures for discussing film, film history, and film theory in German. Prerequisite: GERM 3003.

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.

GERM470V Special Topics (Irregular) (1-3) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for up to 6 hours of degree credit.

GERM5223 Early German Literature: Middle Ages to the Enlightenment (Irregular)

GERM5273 German Literature: Enlightenment, Storm and Stress, and Classicism (Irregular)

GERM5343 Early Modern German Literature: Late 19th and Early 20th Century (Irregular)

GERM5363 German Literature after 1945 (Irregular)

GERM5703 Special Topics (Irregular) May be offered in a subject not specifically covered by the courses otherwise listed. May be repeated for up to 6 hours of degree credit.

Greek (GREK)

GREK4003 Greek Lyric Poetry (Irregular) Readings from selected Greek lyric poems, to be chosen from several appropriate authors from the 7th through the 5th centuries BCE: Archilochus, Hipponax, Sappho, Alcaeus, Tyrtaeus, Minnemos, Semonides, Solon, Xenophanes, Theognis, Pindar, Bacchylides. Prerequisite: GREK 2013 or equivalent.

GREK4013 Greek Epic Poetry (Irregular) Study of the primary works of Greek hexameter poetry, including Homer, Hesiod, and/or the Homeric Hymns, with special attention to issues of oral composition and performance. Prerequisite: GREK 2013.

GREK4023 Greek Philosophy (Irregular) Study of representative works of Greek philosophy, including those of the Pre-Socratics, Plato, and/or Aristotle. 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.

GREK4053 Greek Syntax and Composition (Irregular) Prerequisite: GREK 2013 or equivalent.

GREK4063 Hellenistic Poetry (Irregular) Selections from significant post-classical authors, including Callimachus, Theocritus, Bion, Moschus, Herondas, Apollonios of Rhodes, and/or poets of the Greek Anthology. Special attention to archaic and classical influences, contemporary Hellenistic culture, and Roman responses. Prerequisite: GREK 2013.

GREK4073 Ancient Greek Novel (Irregular) Study of the development of the Greek novel including the works of Lucian, Longus, Heliodorus, and/or Achilles Tatius. Prerequisite: GREK 2013 or equivalent.

GREK4083 Greek Epigraphy (Irregular) Study of inscriptions, especially Attic, in their historical and social contexts, from the 8th century BCE to the Hellenistic/Roman period. Training in epigraphical conventions and symbols. Prerequisite: GREK 2013 or equivalent.

GREK4093 Biblical and Patristic Greek (Irregular) Selected readings from appropriate texts, varying by semester, including the Septuagint, New Testament, Apostolic Fathers, and other patristic literature to the 5th century CE. Reading and discussion of selected texts in major genres. Prerequisite: GREK 2013 or equivalent.

GREK4103 Greek Oratory (Irregular) Readings from selected speeches, to be chosen from one or more appropriate authors: Lysias, Antiphon, Demosthenes, Isocrates, Andocides. Study of sophism and rhetoric of Athens in the 5th and 4th centuries BCE. Prerequisite: GREK 2013 or equivalent.

GREK475V Special Investigations (Sp, Su, Fa) (1-6) May be repeated for credit.

GREK575V Special Investigations (Irregular) (1-6) May be repeated for up to 12 hours of degree credit.

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.

JAPN4313H Honors 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 (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 Rerum 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 secondary 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 up to 6 hours of degree credit.

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 up to 6 hours of degree credit.

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 up to 6 hours of degree credit.

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 credit.

Russian (RUSS)

RUSS4123 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 WLIT 4123)

RUSS4133 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 WLIT 4133)

Spanish (SPAN)

SPAN4003 Advanced Grammar (Fa) For majors and advanced students covering the problematic areas of Spanish syntax and usage. Prerequisite: SPAN 3003 and SPAN 3103.

SPAN4103 Monuments of Spanish Literature I (Irregular) Monuments of the major works of Spanish literature from *El Cid* through the 17th century. Prerequisite: SPAN 3113.

SPAN4113 Monuments of Spanish Literature II (Irregular) Monuments of Spanish literature from the 18th century to the present. Prerequisite: SPAN 3113.

SPAN4133 Survey of Spanish-American Literature I (Irregular) Survey of Spanish-American literature from the Colonial period to mid-19th Century, including pre-Hispanic Indigenous Literatures. Prerequisite: SPAN 3113.

SPAN4193 Survey of Spanish-American Literature II (Irregular) Survey of Spanish-American literature from Modernism to the present, including U.S. Latino literature. Prerequisite: SPAN 3113.

SPAN4213 Spanish Civilization (Irregular) A wide-ranging exploration of Spanish history and culture from the Middle Ages to the present. Prerequisite: SPAN 3113.

SPAN4223 Latin American Civilization (Irregular) Prerequisite: SPAN 3113.

SPAN4243 Literature and Culture in the Hispanic United States (Irregular) 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 (Fa) 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.

SPAN4553 Latin America Today (Irregular) An exploration of recent and contemporary issues in Latin American culture and society, including social classes, ethnicity, urbanization, family, education, and religion, as well as popular culture and artistic movements. Prerequisite: SPAN 3113.

SPAN470V Special Topics (Irregular) (1-3) May be offered in a topic not specifically covered by courses otherwise listed. May be repeated for up to 6 hours of degree credit.

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 (Irregular) 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.

SPAN5393 19th Century Spanish American Literature (Irregular) 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 (Irregular) 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 (Irregular) 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.

SPAN5703 Special Topics (Irregular) May be offered in a subject not specifically covered by the courses otherwise listed. May be repeated for up to 6 hours of degree credit.

SPAN575V Special Investigations (Irregular) (1-6) May be repeated for credit.

SPAN5773 Indigenismo Literature (Irregular) A study of 'indigenismo', an intellectual and literary tradition in Latin America examining the history of exploitation and marginalization of indigenous peoples. Readings include texts by Mariategui, Icaza, Andrade, Asturias, Arguedas, Castellanos, and also 'indigenista' works in music and the plastic arts.

SPAN5883 Indigenous Literatures (Irregular) A study of native oral narratives, literary texts and other writing forms in the Americas, from ancient times to the present, including the Andean Khipus, Mesoamerican Codices, and Amazonian mythic narratives. (Same as SPAN 4883)

The Graduate School of Business

310 Willard J. Walker Hall
University of Arkansas
Fayetteville, AR 72701

Telephone: 479-575-2851
Fax: 479-575-8721

E-mail: gsb@walton.uark.edu
Web: gsb.uark.edu

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., and M.I.S.; Ph.D. concentrations: Accounting, Finance, Information Systems, Management, Marketing, and Supply Chain Management)
8. Official GRE score (M.A. Economics and Ph.D. Economics)
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)

Applicants are encouraged to use our online application procedure. 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
310 Willard J. Walker Hall
1 University of Arkansas
Fayetteville, AR 72701

GRADUATE SCHOOL OF BUSINESS

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.

For students 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 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 of Business, is considered a "readmission" and is required only to submit an Application for Admission, a \$25 processing 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 and admission is not deferred. 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 that their application be held for consideration. 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 one calendar year from the date of the applicant's original proposed semester of entry. However, applicants must file a new Application for Admission to notify the Graduate School of Business of their request for reconsideration. Applicants who are admitted but who do not enroll for one year 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, and Master of Information Systems programs as well as all Ph.D. 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), 213 on the computer-based version of the TOEFL, 79 on the Internet-based TOEFL or a minimum score of 6.5 on the International English Language Training System (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. International applicants and resident alien applicants may refer to Admissions of this catalog for additional information related to their application.

Non-Native Speakers of English. All 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 79 on the Internet-based Test of English as a Foreign Language (TOEFL) or a 58 on the Pearson Test of English-Academic (PTE-A) 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. Students applying to a Ph.D. program in the Sam M. Walton College of Business must submit one of these tests at the time of admission. Resident aliens must submit a copy of their Resident Alien card with 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. 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, 26 on the Internet-based TOEFL (speaking) sub-test, 71 on the PTE-A (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. In no case will a doctoral student be allowed to teach an undergraduate course without meeting the minimum score requirement on one of the above tests. The Walton College of Business requires that scores demonstrating competency in spoken English be submitted as a part of the application, prior to review by the admissions committee.

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 (Writing), IELTS (writing), PTE-A (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(s) 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, although individual departments may require any of these tests for admission.

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 an Internet-based TOEFL writing score of 29, IELTS (writing) score of 7.0, or a PTE-A writing score of 80.
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 World Languages, Literatures and Cultures 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 \$15 charge. Graduate students assessed course work as a result of performance on the ELPT, TOEFL writing, IELTS writing, PTE-A 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, 346 N. Arkansas Avenue, STON 50, 1 University of Arkansas, Fayetteville, Arkansas 72701.

Classifications of Admission to Graduate Standing

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 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 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

1. 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.
2. Approval of the Associate Dean for Research and Graduate Programs, 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 Research and Graduate Programs 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. 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 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 master's degree. Students in the Information Systems ERP Certificate Program (sponsored by SAP America) and the Business Intelligence Certificate (sponsored by SAS Institute) and who are subsequently accepted into the Master of Information Degree Program will be allowed to use up to 12 graduate hours taken as a nondegree seeker toward the MIS degree.

At the time of acceptance into a degree program, the director of the appropriate 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.

A student who has not been enrolled during the previous semester (fall or spring) must submit a new application form to the Graduate School of

Business along with a \$25 processing fee and an official transcript from any institution attended while not enrolled in the Graduate School of Business.

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.
4. the student must have graduate standing and the course(s) must be graduate level.

REGISTRATION AND RELATED TOPICS

The Graduate School's stance on full-time status is thus: 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.

The Graduate School of Business adheres to the guidelines as set forth above 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://grad.uark.edu/>.

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" is recorded. For students admitted to the Graduate School in Fall 2001 or after no credit is earned for courses in which a grade of "F" or "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 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 Research and Graduate Programs 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 Integrity Policy (above) of the University of Arkansas.

For students enrolled in the Master of Accountancy, Master of Arts in Economics, Master of Business Administration, or Master of Information Systems 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.

For students enrolled in the Master of Business Administration degree program, this additional academic standard applies: Any student who earns more than six hours of grades of "C" or lower in graduate courses taken to fulfill requirements for the Master of Business Administration 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 Research and Graduate Programs.

A cumulative grade-point average of 3.00 is required to be eligible for graduation. 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 INTEGRITY

I. Preamble:

As a community of scholars, we uphold academic integrity and our Honor Statement as foundational to appropriate conduct within the university setting. The fundamental trust that work presented as one's own truly represents one's own intellect and effort underlies our mission as an educational, research and service institution; moreover, this trust is central to our peers' recognition of the value of a University of Arkansas degree. Thus, this document represents a deeply- and commonly-held set of values. Because this trust is so essential to the enterprise of the University of Arkansas, this policy has been established to set forth the University's commitment to academic integrity and to create procedures to address allegations of academic misconduct in a fair and unified manner.

Responsibility for understanding and adhering to the values of academic integrity, including being familiar with and complying with this policy, lies with individual students as members of the University community. The University shall assist students in meeting this responsibility through educational efforts such as training held during both undergraduate and graduate new student orientation, and on-line training modules, and may also include training during program-level orientation and in individual classrooms. The University shall also provide a statement on academic integrity that faculty will be encouraged to include in all course syllabi. Again, however, as developing scholars, students must take the initiative to familiarize themselves with and clarify expectations regarding academic integrity.

II. Definitions:

Academic Dishonesty: Academic dishonesty involves acts that may subvert or compromise the integrity of the educational or research process at the University of Arkansas, when such acts have been performed by a UA student. Academic dishonesty includes, but is not limited to, any act by which a student gains or attempts to gain an academic advantage for him/herself or another by misrepresenting his/her or another's work or by interfering with the independent completion, submission, or evaluation of academic work. Academic dishonesty may include those acts defined as research or scholarly misconduct; such academic integrity issues are subject to review under this policy as well as under the University's Research and Scholarly Misconduct Policy. Which policy applies to particular allegations is addressed in more detail below; if necessary, the Research Integrity Officer, in consultation with the student's dean, shall determine which policy is most appropriate for a given case.

Academic Integrity Monitor: In each college/school, one or more Associate Deans will be designated by the Dean, subject to approval by the Provost, as the Academic Integrity Monitor(s). The Academic Integrity Monitor shall be responsible to conduct an initial review of allegations of academic dishonesty at the college/school level to determine whether there is sufficient evidence of a violation for the matter to be considered by the All-University Academic Integrity Board (Board or AUAIB), as defined below. When a student admits responsibility for an infraction, the Academic Integrity Monitor recommends a sanction to the Board, based on the Sanction Rubric. The Academic Integrity Monitor is the School or College's liaison to the Board, and will have primary responsibility for presenting a case to the Board when necessary. If the Academic Integrity Monitor determines the evidence is not sufficient for consideration by the Board, the case will be dismissed unless the instructor (with the support of the Chair) appeals the Monitor's determination to the Board.

All-University Academic Integrity Board (Board or AUAIB): The Board is responsible for reviewing contested allegations of academic dishonesty and contested sanctions referred by the Academic Integrity Monitor. The Board is responsible for making sure that any finding of responsibility for academic misconduct is supported by a preponderance of the evidence and for imposing sanctions consistent with the Sanctions Rubric when a student is found responsible for a violation. The Board is responsible for ensuring that academic integrity sanctions are applied in a consistent manner. Ordinarily, in making its determinations, the Board will not take student intent into account, but instead will focus primarily on the actions of those involved. The Board reviews and makes a determination on all cases in which 1) students are contesting their responsibility (or instructors, with the support of the Department chair, are contesting findings that students are not responsible) for alleged infractions or 2) students are contesting sanctions. In addition, in cases where the student accepts responsibility and does not contest sanctions, the Board reviews sanctions recommended by the Academic Integrity Monitor and imposes sanctions consistent with the Sanctions Rubric. When reviewing cases, the Board may request further information and require participation in a hearing by the instructor and/or students (if deemed appropriate by the Board).

The Board is composed of six faculty or instructional staff (one from each undergraduate academic college), one faculty representative of the library, one representative of the Graduate School or Honors College, and two students (one graduate and one undergraduate). In order to facilitate timely review of cases, there will be two such committees constituted each year and each of these committees will meet one time per month. The committees will elect their own chair. The Director of OAISC will be an ex officio member of the AUAIB. (Note: The School of Law has its own academic integrity process.) There will also be a pool of trained alternates who can sit on the Board in the event that a member is unable to attend a hearing due to a schedule conflict, illness, conflict of interest, or the like. A third committee, which may be comprised of members of the other two committees, will meet during the summer.

Complete Written Record: The complete written record for each case refers to all relevant documents submitted by the student as well as a University representative as evidence related to the allegations of academic dishonesty. The complete written record is initially compiled by the Academic Integrity Monitor but subsequently is forwarded to and maintained by, and may be added to, by the Office of Academic Integrity and Student Conduct.

Jurisdiction: The Academic Integrity Monitor is responsible for the initial review of all undergraduate cases involving work in courses taken in his/her college. The Academic Integrity Monitor is also responsible for initial review of all cases involving allegations of academic dishonesty in other academic work (with the exception of those cases reviewed under the Research Misconduct Policy), when the faculty member who has oversight responsibility for that student (e.g. major professor, faculty collaborator, honors advisor, advisor) resides within the college. When a student is majoring in a program outside the college in which an academic integrity matter arises, the Academic Integrity Monitor of the other college should be kept informed about the case and its resolution. The Academic Integrity Monitor in the Graduate School is responsible for all cases of alleged academic dishonesty involving graduate students (including, without limitation, all allegations relating to course work or work outside a class), with the exception of those cases which fall under the jurisdiction of the Research Misconduct Policy.

Office of Academic Integrity and Student Conduct (OAISC) (formerly Office of Community Standards and Student Ethics): Housed in the Office of the Provost/Vice Chancellor for Academic Affairs, this is the University-level office tasked with processing academic misconduct cases that are sent forward from the colleges. This Office is responsible for reporting back to the academic colleges, the Provost, and the Faculty Senate, consistent with the requirements of the Family Educational Rights and Privacy Act (FERPA), an annual total

of cases heard and their outcomes, as well as the general basis for the decisions made. This Office is the repository of all records pertaining to academic integrity cases across campus.

Preponderance of Evidence: The standard of proof in a case arising under the Academic Integrity Policy shall be the “preponderance of the evidence.” A “preponderance of the evidence” shall mean evidence which is of greater weight or more convincing than evidence to the contrary; evidence which shows that something more likely than not is true.

Reporting: Following initial compilation by the Academic Integrity Monitor, all records will be kept in OAISC. A final report summary for each case will be forwarded to the college Academic Integrity Monitor, to the department chair/head, and to the instructor. Annual summary reports (with no details with respect to specific faculty or students) will be reported to the Colleges and to the Faculty Senate.

Sanction Rubric: Sanctions associated with various levels of academic misconduct, approved by the Faculty Senate and applicable to all student academic work at the University of Arkansas. All sanctions will be imposed by the AUAIB.

Academic Honesty Syllabus Statement: Faculty are encouraged to include this statement on their syllabus:

“As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.”

“Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ which may be found at <http://provost.uark.edu/> Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.”

Student: An undergraduate student is one who is enrolled at the University of Arkansas during the semester of the infraction in a baccalaureate degree program or in an undergraduate non-degree-seeking status. A graduate student is one who has been admitted to the Graduate School and need not be enrolled to be considered a student under this policy.

Work for a course: “Work for a course” consists of any work undertaken or submitted towards the fulfillment of the requirements of a course (whether graded or not), including, but not limited to, exams, quizzes, papers, essays, homework assignments, artwork, designs, programs, and other projects or assignments.

Work outside of a course: “Work outside a course” consists of student work, other than work for a course, undertaken or submitted towards the fulfillment of the requirements of a degree or program, including, but not limited to, candidacy or comprehensive exams, dissertations, honors theses, master’s theses, work done for funded research projects, reports submitted to a funding agency or material submitted for publication in a scholarly journal.

Working Days: Working days shall refer to Monday through Friday, excluding official University holidays or days that the University is closed due to exigent circumstances such as weather. For periods of five days or less, University breaks shall also be excluded.

III. Procedures:

A. Infractions Involving Work for a Course at the Undergraduate or Graduate Level

1. Reports of Suspected Academic Dishonesty. When an instructor/department initially suspects that a student has violated the Academic Integrity Policy, the instructor or another appropriate University official may discuss the matter with the student and/or with the Academic Integrity Monitor for the college or school. Should the instructor/department determine that the student may

be responsible for academic dishonesty, the instructor or another appropriate University official will, within five working days after determining that there is a potential violation of the Academic Integrity Policy (or as soon as practicable thereafter), report the case to the Academic Integrity Monitor for the college. In reporting the case, the instructor/official will submit a completed "Allegation Evidence Form," available on the OAISC website, to help ensure that all information necessary to the consideration of the case is available for review.

2. The Academic Integrity Monitor. The Academic Integrity Monitor will review the case and meet with the instructor to gather any relevant information relating to any alleged violations of the Academic Integrity Policy. The Academic Integrity Monitor shall meet separately with the student to notify the student of the alleged violations of the Academic Integrity Policy, disclose to the student any evidence to be used against him or her, and gather information from the student about the matter. The Monitor will have access to any previous academic integrity-related records for the student from the OAISC and may review pertinent records or speak with other individuals with knowledge about the matter. Information compiled by the Academic Integrity Monitor may be added to the written record. After conducting this review the Academic Integrity Monitor may proceed as follows:

- a. The Academic Integrity Monitor may determine that **the evidence of an alleged violation is insufficient to warrant forwarding the case to the Board.** In this case, the Academic Integrity Monitor will notify the instructor/Department and student of his/her determination. The complete written record of the Academic Integrity Monitor's determination will be forwarded to the OAISC, and a summary of the matter shall be provided to the AUAIB for its information.
 - i. If the Instructor, with the support of the Department/program chair/head/director, disagrees with the determination of the Academic Integrity Monitor, the instructor's position shall be reported to the AUAIB for consideration by the Board.
- b. Alternatively, the Academic Integrity Monitor may determine **there is sufficient evidence of a violation to forward the matter to the Board for its consideration**, in which case the following may occur:
 - i. **The student accepts responsibility for the infraction:** In this case, the Academic Integrity Monitor shall inform the student of the potential consequences of the action. The Academic Integrity Monitor completes the file and recommends the appropriate sanction for consideration by the AUAIB consistent with the Sanction Rubric, makes a record of the case which is forwarded to the OAISC and AUAIB, and reports back to the Department/program and instructor.
 - ii. **The student contests responsibility for the infraction:** In this case, the Academic Integrity Monitor will forward the case together with the evidence to OAISC and AUAIB. Within five working days from receipt of the Allegation Evidence Form (or as soon thereafter as practicable), a representative from OAISC will contact the student and arrange a meeting during which the process and possible outcomes are explained to the student. As part of the complete written record, the student will be provided with an opportunity to submit a written statement responding to the allegations and explaining why he/she did not commit the alleged infraction. Ordinarily, the student will not provide a statement pertaining to intent, unless it materially affects the question of whether the student

committed a violation of the Academic Integrity Policy.

iii. The student contests the sanctions: If the student 1) accepts responsibility but disagrees with the Academic Integrity Monitor's sanction recommendation, or 2) contests responsibility and sanctions, the student will be provided an opportunity to submit a written statement explaining the student's position on sanctions and proposing alternatives. If the proposed sanction is based on the sanction rubric, the statement must address how the rubric has been applied incorrectly in the student's case.

3. Standard of Evidence. The standard used in reviewing whether a violation of the Academic Integrity Policy has occurred under this policy shall be the preponderance of the evidence.

4. Continued Participation. To the extent practical, during the consideration of a case, the student's participation in the affected class should continue in order to minimize the impact on the student if he or she is not determined to be responsible for an alleged infraction.

B. Infractions Involving Work Outside a Course at the Undergraduate or Graduate Level: Cases of alleged academic misconduct occurring outside a course, as defined previously, may be subject to review under this policy as well as under the University's Research and Scholarly Misconduct Policy. Which policy applies to particular allegations is determined by the Research Integrity Officer and the student's dean. Except when a matter is determined to be properly considered under the Research and Scholarly Misconduct Policy, rather than this policy, when a supervising faculty member or other appropriate University official determines that a student may be responsible for academic dishonesty in a situation involving work outside a course, the procedures outlined in this policy shall be followed.

C. The All-University Academic Integrity Board

1. Based on the record filed, including the Allegation Evidence Form, the AUAIB shall determine responsibility (if necessary) and impose the appropriate sanction. In addition, with notice to the student, the Board may request additional evidence, require students, the instructor, or other appropriate University officials to be present at a hearing and/or refer the matter back to the Academic Integrity Monitor for further consideration. Ordinarily, a student will meet with the Board only if the Board so requests it, having already met with the Academic Integrity Monitor and provided his/her written statement for the Board. However, if the student is facing a possible sanction of suspension or expulsion, or loss of a scholarship, he/she shall be permitted to meet with the Board and present witnesses and evidence, if the student desires. If a student is not facing possible suspension, expulsion or loss of a scholarship, and the student requests a meeting, the Board shall designate one of its members to meet with the student prior to the Board's consideration of the case. If a member meets with the student, the member shall participate in the Board's consideration of the alleged infractions.
2. In the case where a student and the instructor or other University official reporting the alleged infraction are requested to appear at a Board hearing, each must have at least ten working days' notice of the hearing, unless both agree to waive this requirement. If any material is added to the Complete Written Record, the student shall have at least three business days prior to the Board hearing to review the information. The student, the instructor or other appropriate University official, and the Academic Integrity Monitor for the case, who will have primary responsibility to present the infractions, will attend the Board meeting. Generally these

individuals will be the only persons in attendance, other than the Board and OAISC staff. The Board may question any of these individuals. The instructor will not ordinarily be asked to make a statement, but may be asked questions by the Board. The Board shall review the complete record of the case to determine whether a preponderance of the evidence exists to find a violation of the Academic Integrity Policy and if so, impose a sanction consistent with the Rubric. Because the focus of the hearing is generally not on intent, other witnesses will typically not be called unless the Board determines that the witnesses can address whether the student committed the alleged infraction.

3. When sanctions are imposed, the letter outlining the sanctions will be signed by the Chair on behalf of the Board and by the Director of OAISC and sent to the student and the instructor, with a copy to the Academic Integrity Monitor.

D. Appeals. Students (or the instructor, with the support of the Department Chair) may appeal a determination by the AUAIB to the Provost and Chancellor, but only when the appeals are based on the following grounds: (1) a procedural error occurred; (2) an objective assessment of the evidence under the preponderance of evidence standard does not support a finding of responsibility; (3) new and significant evidence has been identified since the Board hearing; (4) the sanctions are inconsistent with the Sanction Rubric; or (5) that additional sanctions imposed are excessive. To effect an appeal, the student (or instructor/department), within five working days of transmittal of the decision of the AUAIB to the student (or instructor/department), shall request that the Provost and Chancellor review the case, using the "Appeal Form" found on the website of the OAISC. The transmittal of the decision by the AUAIB shall expressly state that the student (or instructor/department) shall have five days to appeal the decision. The Provost and Chancellor shall attempt to review and resolve all appeals within thirty days or as soon as possible thereafter after receiving the Appeal Form. If the Provost and Chancellor determine that a procedural error occurred, that an objective assessment of the evidence does not support a finding of responsibility, that new evidence warrants a rehearing, that an inconsistency in sanction has occurred, or that additional sanctions are excessive in nature, the Provost and Chancellor may decide the matter or may refer the case back to the same or to another AUAIB for further action. If a new hearing is held, the case may be appealed to the Provost and Chancellor using the procedure outlined above, in which case their determination on the matter shall be final.

E. Procedural Changes. Particular circumstances in an individual case may dictate variation from the procedures set out in this policy in order to ensure fair and efficient consideration of the matter. Any change in the procedures must ensure fair treatment of the student. Any major deviations from the procedures described in this policy shall be made only with the written approval of the Provost.

ACADEMIC INTEGRITY SANCTION RUBRIC

I. Violation Levels

The following violation levels are assigned to specific types of violations of the University's Academic Integrity Policy; if a violation of academic integrity principles occurs which is not specifically provided for below, then any sanctions will be based on the most similar type of violation that exists in the rubric. A violation will be considered as a single violation up until the point that a student receives notice of that violation; additional infractions occurring after that point will be considered separately for purposes of this rubric.

A student receives the assigned number of sanction points for each violation for which he/she is found responsible. Sanction points are cumulative over the length of the student's tenure at the University of Arkansas.

Level One Violation – 0.5 sanction point for each violation

- Copying from or viewing another student's work during an examination.
- Using any materials or resources that are not authorized by the instructor for use during an examination.
- Collaborating during an examination with any other person by giving or receiving information without specific permission of the instructor.
- Facilitating or aiding in any act of academic dishonesty.
- Collaborating on laboratory work, take-home examinations, homework, or other assigned work when instructed to work independently.
- Submitting, without specific permission of the instructor, work that has been previously offered by the same student for credit in another course.
- Falsification of attendance and/or participation.
- 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 (undergraduate level).

Level Two Violation – 1.0 sanction point for each violation

- Buying, selling or otherwise obtaining or providing information about an examination not yet administered.
- 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, speech, painting, drawing, sculpture, or other written or creative work or project of any nature prepared totally or in large measure by another.
- Submitting altered or falsified data (undergraduate level).
- Plagiarizing (graduate level).

Level Three Violation – 3.0 sanction points for each violation

- Altering grades or official records.
- Falsifying or signing another person's name on any academically-related University form or document.
- Sabotaging another student's work.
- Submitting altered or falsified data (graduate level)

II. Sanctions

Sanction points = 0.5: For work for a course, the instructor shall give the test or an assignment an immediate zero (0) which shall then be averaged into the course grade. If the violation occurred on work outside of a course, the faculty member will require that the work be redone. If that involves missing a stated deadline, the stated late penalty will apply.

Sanction points = 1.0: The student will receive a course grade of XF for work done for a course; for work outside a course, the student will receive a failure on the project (e.g. on the candidacy exam).

For infractions involving point levels of 1.5 and above, the course grade/project failure sanction will apply in addition to suspension or expulsion.

Sanction points = 1.5: The student will be suspended for the follow-

ing semester (the student will be allowed to complete the current semester).

Sanction points = 2.0: The student will be suspended for two full semesters (the student will be allowed to complete the current semester).

Sanction points = 2.5: The student will be suspended for three full semesters (the student will be allowed to complete the current semester).

Sanction points = 3.0 or more. The student will be immediately and permanently expelled.

Note: For offenses not specifically mentioned in this rubric, faculty members may confer with the Academic Integrity Monitor and propose a description of the offense and the level of sanction to be included in the faculty member's syllabus. The proposed description and sanctions will be forwarded to the Academic Integrity Monitor to review the proposed offense and sanction for consistency with existing offenses and sanctions. If a faculty member and Academic Integrity monitor disagree over a particular offense or sanction, the matter may be discussed with the relevant dean and /or the AUAIB, but must be reported to the AUAIB. In the event of a conflict between a syllabus and the Academic Integrity Policy or this rubric, the policy and rubric shall take precedence.

III. Course Retake Opportunities and Notation Removal

After two semesters of acceptable performance at the University following the imposition of a penalty, with no student conduct or academic dishonesty infractions and a minimum grade point of 2.0 (undergraduate) and 2.85 (graduate) in graded courses, the student may petition the Office of Academic Integrity and Student Conduct for an opportunity to retake a class failed due to academic dishonesty and have the grade changed (for graded work), for a first offense of any Level One or Level Two violation, or a second offense of a Level One violation.

Upon graduation or completion of the period of suspension, the student may request that the X, or notation of the student's suspension, be removed from the student's transcript, by submitting a written request to the Provost/Vice Chancellor for Academic Affairs. Expulsion from the University of Arkansas for academic dishonesty shall be permanently noted on the student's transcript.

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 41.

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 School of Business 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 40.

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 master's programs (M.Acc., M.A.Econ., and M.I.S.) 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. utilize 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 designee, 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 in Economics

Doctor of Philosophy in Business Administration

Concentration Areas:

Accounting

Information Systems

Finance

Management

Marketing

Supply Chain Management

Master of Accountancy

Master of Arts in Economics

Master of Business Administration

Master of Information Systems

Overview – Master's Degrees in the Sam M. Walton College of Business

Each Master's Degree in the Sam M. Walton College of Business is designed to prepare a student for a career in the professional world of business. The programs provide a broad-based education where critical thinking, creative problem solving and professional resolve are encouraged. Much of the curriculum is team-based, simulating experience in the corporate environment. Successful students have demonstrated potential for growth, maturity, motivation and leadership.

Overview – Ph.D. Programs in the Sam M. Walton College of Business

The Ph.D. programs in Business Administration and Economics are designed primarily to prepare individuals for teaching, research, service, and collegial roles in academic and research institutions. The degree programs provide: a) an exposure to the functional areas of business, b) intensive study of the relevant body of knowledge in a focused area, 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 the emphasis in accounting) as in-state students for fee purposes. Please see the Graduate School's website for general information regarding the declaration of intent, candidacy examinations, dissertation requirements, and final examinations.

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 Sam M. Walton College of Business Associate Dean for Research and Graduate Programs.

Students apply for admission to one of the following concentrations:

- Accounting
- Information Systems
- Finance
- Management
- Marketing
- Supply Chain Management

Requirements for the Ph.D. Programs in the Sam M. Walton College of Business:

1. Course work and seminars: The requirements for the Ph.D. in Business Administration and Ph.D. in Economics will consist of a program of research, appropriate course work, seminars, and independent study as specified by the student's program.
2. Comprehensive Examination: Satisfactory completion of a comprehensive examination in the concentration is required.
3. Dissertation: A dissertation will be written and successfully defended in the concentration.

GRADUATE SCHOOL OF BUSINESS DEPARTMENTS AND COURSE DESCRIPTIONS

ACCOUNTING (ACCT)

Vernon Richardson
 Department Chair and S. Robson Walton Chair in Accounting
 401 Walton College of Business
 479-575-4051

Linda Myers
 Ph.D. Program Director
 479-575-4051

Gary Peters
 M.Acc. Program Director
 479-575-4051

- S. Robson Walton Chair in Accounting Professor Richardson
- Doyle Z. and Maynette Derr Williams Chair in Professional Accounting Professor Pincus
- Ralph L. McQueen Distinguished Chair of Accounting Professor Myers (J.)
- Walter B. Cole Chair of Accounting Professor Bouwman
- Nolan E. Williams Lecturer in Accounting Professor Norwood
- Doris M. Cook Chair in Accounting Professor Peters
- Garrison-Wilson Chair in Accounting Professor Myers (L.)
- BKD Lectureship in Accounting Clinical Professor Leflar
- Associate Professor Sanchez
- Assistant Professors Cassell, Huang, Chi, Keshek
- Instructors Cooper, Widener

Degrees Conferred:

- Ph.D. in Business Administration, Accounting Concentration
- Master of Accountancy

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 Advanced Financial Accounting
- ACCT 5433 Fraud Prevention and Detection
- ACCT 5953 Assurance Services
- ACCT 5873 Advanced Taxation

A minimum of six semester hours of the student's program must be non-accounting electives. Six 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 Graduate School of Business, Sam M. Walton College of Business, University of Arkansas, Willard J. Walker Hall 310, Fayetteville, AR 72701, or e-mail: gsb@walton.uark.edu.

B.S.B.A./M.ACC. Integrated Program

The integrated program to the Master of Accountancy is a five-year program of undergraduate and graduate coursework that allows outstanding students to earn the B.S.B.A. and the Master of Accountancy (M.Acc.) degrees at the same time. The professional curriculum, which usually begins in the student’s senior year, includes specially designed accounting courses taught in relatively small classes by full-time faculty members. Students accepted into the integrated degree program may concurrently enroll in undergraduate and graduate level courses.

Because M.Acc. graduates are expected to become leaders in the accounting profession, highly motivated students with the personal qualities and intellectual capacity to establish successful careers in public accounting, industry, not-for-profit organizations, and higher education are encouraged to apply.

Admission: Students are admitted to the integrated program according to the following requirements. Admission is granted only for the fall semester; June 1 is the application deadline for those who wish to begin the integrated program the following fall. Students interested in this program must have completed 90 credit hours of study towards the baccalaureate degree (including ACCT 2013, ACCT 3533, ACCT 3613, ACCT 3723) by the June 1 deadline:

Acceptance into the integrated program is based upon the discretion of the admissions committee. The committee considers the overall quality of the applications including the overall grade point average, the grades in ACCT 2013, ACCT 3533, ACCT 3613, ACCT 3723 and the Graduate Management Admission Test (GMAT), as well as other relevant examples of academic ability and leadership. To receive serious consideration by the admissions committee, a student should have a minimum GPA of 3.0 within the applicant’s overall university and accounting coursework. Due to the demand for seats in the program, the admissions committee selectively restricts admission into the program based upon the availability of instructional resources. Students

must complete at least two long-session semesters in residence in the M.Acc. program.

Transfer students will be handled on a case-by-case basis.

Satisfactory Progress: Students are expected to make continuous progress toward the degree by completing required accounting coursework each semester. Students who fail to meet the requirements for the M.Acc. program must choose another major of study or finalize their B.S.B.A. in Accounting. Students will be notified before this action is taken and should meet with an academic advisor in the Undergraduate Programs Office upon notification.

Probation: A student is placed on probation if his or her grade point average in core undergraduate accounting courses falls below 3.00. Except with the consent of the M.Acc. Program Director a student on probation may not take graduate accounting courses.

Graduation: To receive an integrated B.S.B.A./M.Acc. degree, a student must have a grade point average of at least 3.00 in all coursework taken as part of the minimum thirty hour M.Acc. degree. He or she must also have a grade point average in graduate accounting coursework of at least 3.00.

Degree Requirements:

The requirements of B.S.B.A./M.Acc. Integrated program are:

1. Undergraduate coursework
 - a. Complete the requirements for the B.S.B.A. degree requirements and Accounting Major Requirements detailed above.
 - b. Students are strongly encouraged, but not required, to participate in an accounting internship, ACCT 310V.
2. Graduate coursework

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..

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).

A minimum of 18 semester hours of accounting are required, 12 hours of which are specified:

- ACCT 5413 Advanced Financial Accounting
- ACCT 5433 Fraud Prevention and Detection
- ACCT 5953 Assurance Services
- ACCT 5873 Advanced Taxation

A minimum of six semester hours of the student’s graduate program must be non-accounting electives.

The M.Acc. degree program does not require a thesis. Successful completion of integrated B.S.B.A./M.Acc program from the University of Arkansas will qualify a student to take relevant professional examinations.

For further information, write to the Graduate School of Business, Sam M. Walton College of Business, University of Arkansas, Willard J. Walker Hall 310, Fayetteville, AR 72701, or e-mail: gsb@walton.uark.edu.

Ph.D. in Business Administration, Accounting Concentration Program Structure

The doctoral program in accounting consists of the following elements: course work, two summer papers, a comprehensive examination, and a dissertation. The latter involves an oral defense of both the dissertation proposal as well as the final dissertation. It is anticipated that all required course work, including accounting seminars, tool courses, and supporting courses, will be completed in two to two and a half years (a total of 42 hours excluding colloquium and dissertation credit). Students must recognize a joint responsibility in their preparation to perform research and, in some cases, may wish to take courses beyond those specified to strengthen their skills and abilities in fields

that will contribute to successful completion of their dissertation.

The seminars will be offered in alternating years, A and B, respectively.

Year A:

Seminar I covers research methods and research design, with an emphasis on disclosure choices and consequences.

Seminar II presents an overview of accounting research, focusing on auditing and corporate governance.

Year B:

Seminars III and IV present an overview of accounting research, and emphasize capital markets research and selected research topics respectively.

After these four seminars, students are able to select an area of specialization. The expectation is that students take two specialized seminars. For example, students could take seminars offered by the Finance Department.

Research Tools

Required Courses:

ECON 5213 Mathematics for Economic Analysis

ECON 5613 Econometrics I

ECON 6623 Econometrics II

ECON 5533 Microeconomic Theory I

Elective Courses: (select at least two courses from the following)

ECON 6233 Microeconomic Theory II

ECON 6633 Econometrics III

ECON 6713 Industrial Organization I

ISYS 5623 Statistical Analysis

ISYS 5613 Business Applications of Non-Parametric Statistics

ISYS 5723 Computer Methods in Research

MKTG 6433 Seminar in Research Methods

STAT 5313 Regression Analysis

Supporting Courses

Nine hours of supporting courses are selected by the student in consultation with the accounting doctoral program coordinator. Generally such courses should be concentrated in a specific field in business or out-side business (e.g. psychology, sociology, etc.) to meet the objectives of the student's program. All supporting courses taken must be completed with a grade of "B" or higher prior to sitting for the written comprehensive examination in Accounting.

Research Requirement

The Accounting Doctoral Program emphasizes the development of strong analytic skills and the mastery of sophisticated research methods. The program involves doctoral students in research at the beginning of the program. The intent of the first year research project is for students to explore an area of scholarship and to develop skills to conduct original research within a team framework. During the first and second years, under the direction of a qualified faculty member or members, the student identifies an area of interest that would lead to a summer working paper.

The summer project is a concerted scholarly effort with faculty providing broad, but detailed formal guidance. The goal is to produce a paper publishable in a highly respected, academic journal, which may be co-authored by the doctoral student and the faculty member or members.

Requirements for the research teams include highly motivated students, strong faculty involvement, structured projects, commitment to deadlines, commitment to goals, and continuous project review.

Comprehensive Examination

After satisfactory completion of all required course work, each Ph.D. student must pass a written comprehensive examination prepared by the Doctoral Program Committee of the Department of Accounting and administered on a date selected by the Doctoral Program Committee. Each student is expected to take the written comprehensive exam within 36 months after starting coursework. If the written comprehensive examination is failed, it should be retaken within 6 months after the failure on a date selected by the Doctoral Program

Committee of the Department of Accounting. If the written comprehensive is failed a second time, and if the Doctoral Program Committee allows a third sitting, the examination must be retaken within 6 months after the second failure. Failure to satisfactorily complete the written comprehensive examination results in termination from the program.

Summer Paper

Students are required to complete summer papers during the first and second years of their residence. The summer papers represent an opportunity to practice the development and execution of a complete research project under the guidance and tutelage of an experienced faculty member or members. They constitute the final "practice run" before embarking on the dissertation. In addition, the summer papers provide an opportunity to explore a specific area of accounting as a potential source for dissertation research. A final benefit of the summer papers is the development of manuscripts that are expected to yield publications by the time the student completes the program or afterward.

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: ACCT 3723 with a grade of "C" or better. May be repeated for credit.

ACCT4673 Product, Project and Service Costing (Fa) Cost systems with emphasis on information generation for cost management of products, projects and services. The course includes spreadsheet and other computer program analysis. Prerequisite: ACCT 3613 and ACCT 3723 with grades of C or better.

ACCT4963 Audit and Assurance Services (Sp) Professional standards and procedures as applied to external and internal assurance engagements. Including coverage of the economic role of assurance providers, engagement planning, risk assessment, evidence gathering, and reporting. Prerequisite: ACCT 3723 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, and operational budgeting. Focuses on improving decision making processes, and linking the impact of retail/supply chain decisions to financial statements and shareholder value.

ACCT5413 Advanced Financial Accounting (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 3753 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 512V with a grade of "C" or better.

ACCT5443 Asset Management (Irregular) Managing assets to achieve corporate strategy. Included are issues such as strategy formulation, acquisition processes, internal controls, system requirements, accounting measurements, inventory models, re-engineering, capital budgeting, tax issues, and discussion of current business events that have ethical implications. Prerequisite: MBAD 513V with a grade of "C" or better.

ACCT5463 Financial Statement Analysis (Sp) This course is designed to study financial statements and their related footnotes; tools and procedures common to financial statement analysis; the relationships among business transactions, environmental forces (political, economic, and social), and reported financial information; and how financial statement information can help solve certain business problems. Prerequisite: ACCT 3723 with a grade of "C" or better.

ACCT549V Special Topics in Accounting (Irregular) (1-3) Seminar in current topics not covered in other courses. Students may enroll in one or more units. May be repeated for up to 3 hours of degree credit.

ACCT5873 Advanced Taxation (Fa) In-depth coverage of the tax treatment of corporations including advanced tax issues. Introduction to tax research including the organization and authority of tax law; accessing and using the tax law; and, applying tax law to taxpayer scenarios. Prerequisite: ACCT 3843 or equivalent with a grade of "C" or better.

ACCT5883 Individual Tax Planning (Sp) In-depth coverage of the tax treatment of passthrough business entities including advanced tax issues. Overview of the income tax treatment of estates and trusts. Overview of the essentials of estate and gift taxation. Prerequisite: MBAD 512V or ACCT 3843 each with a grade of "C" or better.

ACCT5953 Auditing Standards (Fa) Professional aspects of financial statement auditing and registered auditors. Including ethics and legal responsibilities; internal control testing; critical evaluation of evidence; application of sampling; and reporting problems. Prerequisite: ACCT 4963 with a grade of "C" or better.

ACCT6013 Graduate Colloquium (Irregular) Presentation and critique of research papers and proposals. May be repeated for up to 9 hours of degree credit.

ACCT6033 Accounting Research Seminar I (Irregular) 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 (Irregular) 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 (Irregular) 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, Fa) (1-6) Special research project under supervision of a graduate faculty member.

ACCT6433 Accounting Research Seminar IV (Irregular) 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 (Irregular) 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, Fa) (1-18) Prerequisite: Candidacy.

BUSINESS ADMINISTRATION (WCOB)

Moez Limayem

Associate Dean for Research and Graduate Programs
328 Walton College of Business
479-575-2851

Faculty are listed by department.

Degrees Conferred:

Graduate Certificate in Entrepreneurship
M.B.A.
Ph.D in Business Administration

Master of Business Administration

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. Three plans of study are offered: the full-time program, the managerial (part-time) program and the executive program (offered in Shanghai, China). The full-time program can be finished in 16 months; the managerial program requires a minimum of 24 months of study; the executive program can be completed in 17 months. The degree is a non-thesis program. See page 171 for M.B.A. academic dismissal policy.

The full-time M.B.A. 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, nine core business courses, a capstone project, and a two-course sequence in strategic retail management. The executive MBA program consists of a lock-step sequence of core business courses and a capstone project.

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 M.B.A. program offers a single concentration in value chain optimization in the consumer products and retail sectors. The executive M.B.A. program is focused on consumer packaged goods and retail industries, especially those based in China.

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, please access the information online at gsb.uark.edu or contact:

MBA Program Director
310 Willard J. Walker Hall
1 University of Arkansas
Fayetteville, AR 72701
479-575-2851

Requirements for the Master of Business Administration Degree, Full time Program:

Spring I (16 hours)
MKTG 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 5511 Special 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 5333 Retailing Strategy and Processes

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 523V 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 522V 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

MGMT 5373 International Management

Executive M.B.A. Program

Spring

TLOG 5633 Retail and Consumer Products Supply Chain Management

ACCT 5223 Accounting for Supply Chain and Retail Operations

MBAD 591V Capstone Project

Summer

MKTG 5553 Shopper, Buyer and Consumer Behavior

MBAD 592V Capstone Project

Fall

FINN 5443 Retail Finance

MBAD 577V China Business Law and Regulations

ECON 5243 Economics of Supply Chain and Retail

MBAD 593V Capstone Project

Spring

MKTG 5103 Retail Marketing

ISYS 5433 Enterprise Systems

TLOG 5653 Global Logistics and Supply Chain Management

MGMT 5223 Managing and Leading Organizations

MBAD 594V Capstone Project

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. If the student is accepted into both programs, a maximum of six hours of approved upper-level elective law courses may be used as duplicate credit toward the M.B.A. degree and a maximum of six hours of approved graduate courses in business administration may be used as duplicate credit toward the J.D. degree, thus reducing the total time necessary for completion of the degrees.

M.B.A./M.P.S. Concurrent Degrees

Students interested in obtaining both the Master of Business Administration (M.B.A.) and the Clinton School of Public Service Master of Public Service (M.P.S.) degrees may pursue both degrees concurrently. The programs require separate application and admission to both the Clinton School of Public Service and the Graduate School of Business M.B.A. program. Students participating in the M.B.A./M.P.S. programs concurrently must file a degree plan for both degrees and obtain prior approval to take courses to be used for reciprocal credit. Interested students should obtain applications from both the Walton College Graduate School of Business and the Clinton School of Public Service.

Graduate Certificate in Entrepreneurship

The Graduate Certificate in Entrepreneurship is designed to give non-business graduate students a foundation in the core aspects of entrepreneurship they will need to start successful enterprises, to create and promote new products or service offerings in existing organizations, or to engage in social entrepreneurship. The Certificate program is open to all non-business graduate students at the University of Arkansas, and graduate students from all majors are encouraged to participate. Students who complete the Graduate Certificate in Entrepreneurship will have explored the context, tools, and processes of entrepreneurial activity and will have learned how to apply them to commercial and non-commercial enterprises.

Admission Requirements: The Graduate Certificate in Entrepreneurship is open to all non-business graduate students who are in good standing with the graduate school. Students must apply and be admitted to the Graduate School of Business. Information regarding Graduate School of Business admission requirements can be found earlier in this chapter.

Requirements for the Graduate Certificate in Entrepreneurship: (12 hours)

To receive the Graduate Certificate in Entrepreneurship, students are required to take 9 hours of coursework in the Walton College of Business and 3 hours of electives related to entrepreneurship in either the Walton College or in another college at the University of Arkansas. Elective courses other than those listed below may be approved by the Director of the Certificate program. Some elective courses have prerequisites that are not met by courses in the certificate program. Students are advised to check prerequisites prior to enrolling in a course.

Required Courses (9 hours)

MGMT 5213 Foundations of Business for Entrepreneurs

MGMT 5323 New Venture Development

MBAD 5413 Business Plan Project

Elective Course (3 hours)

Students should choose three hours of coursework from among the following:

Dale Bumpers College of Agricultural, Food, and Life Sciences
 AGECE 5113 Agricultural Marketing Analysis
 AGECE 5143 Financial Management in Agriculture
 AGECE 5413 Agribusiness Strategy
 BENG 5713 Food Product and Process Development (joint with College of Engineering)
 HESC 4463 Administration and Evaluation of Child Development Programs
 HESC 4903 Recent Advances in Manufacturing and Merchandising

J. William Fulbright College of Arts & Sciences
 ARTS 493V Fine Arts Gallery Internship
 ARTS 494V Graphic Design Internship
 COMM 5403 Organizational Communication
 COMM 5423 Seminar in Mass Media Cognition
 JOUR 5063 Issues in Advertising and Public Relations
 JOUR 5323 Documentary Production I

Walton College of Business
 FINN 636V Special Topics in Finance: Entrepreneurial Finance
 MBAD 535V Internship
 MGMT 5993 Entrepreneurship Practicum
 MGMT 5363 Innovation and Creativity
 MKTG 5433 Consumer and Market Research
 MKTG 5553 Shopper, Buyer, and Consumer Behavior

College of Education and Health Professions
 HKRD 5883 Sports Facilities Management
 KINS 5473 Administration in Athletic Training
 RECR 5843 Tourism

College of Engineering
 INEG 4433 Systems Engineering and Management
 INEG 4443 Project Management
 INEG 5423 Engineering in Global Competition
 INEG 5623 Analysis of Inventory Systems

Graduate School
 MEPH 5383 Research Commercialization and Product Development
 MEPH 5821 Ethics for Scientists and Engineers
 MEPH 5831 Proposal Writing and Management

Walton College of Business (WCOB)

WCOB500V Study Abroad (Sp, Su, Fa) (1-6) Open to graduate students studying abroad in officially sanctioned programs. May be repeated for up to 12 hours of degree credit.

WCOB5023 Sustainability in Business (Sp, Fa) The course focuses on theoretical and practical bases for pursuing sustainability in business and society.

WCOB510V Special Topics in Business (Irregular) (1-3) Special business topics of an interdisciplinary nature. May be repeated for up to 6 hours of degree credit.

WCOB5213 ERP Fundamentals (Su, Fa) 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 (Fa) 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 or equivalent.

WCOB5843 Cross-Sector Collaboration for Sustainability (Irregular) This course explores how organizations in the three sectors of society work together in value creation by addressing social and environmental problems. Focusing on business and nonprofit organizations, we investigate the forces that bring about and influence these collaborations from practical and theoretical perspectives, and managerial responses to collaboration challenges. Prerequisite: Graduate Status.

WCOB6111 Seminar in Business Administration Teaching I (Fa) 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.

Master of Business Admin (MBAD)

MBAD511V Corporate Financial Management (Sp) (2-3) Financial analysis, planning and control; decision making and modeling for financial managers; and financial policies for management.

MBAD512V Accounting Decisions and Control (Su) (2-3) Preparation and utilization of financial information for internal management purposes: planning and special decisions, cost determination, performance evaluation, and controls.

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.

MBAD521V Leading High Performance Organizations (Irregular) (2-3) Managing in a global workforce, including human resource issues, motivation, performance evaluation, quality concepts, transformational leadership, and selection/ recruitment/ development of employees.

MBAD522V Managing Ideas, Products, and Services (Irregular) (2-3) Product management, market research, marketing communications, retailing and distribution, consumer behavior, and social and ethical implications of marketing.

MBAD523V Economics of Management and Strategy (Irregular) (2-3) Information economics and applied game theory.

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 business in society

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. MBA Director approval required. May be repeated for up to 3 hours of degree credit.

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 for credit.

MBAD5413 Partnering Project (Irregular) A large-scale, real world, 10 week project involving hands-on work addressing issues faced by managers in partnering firms. Corequisite: Instructor consent. Prerequisite: MGMT 5323.

MBAD5433 Capstone Project (Su) A large-scale project integrating various business topics. Prerequisite: MGMT 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 up to 5 hours of degree credit.

MBAD5602 Introduction to the Value Chain (Fa) 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.

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.

MBAD5773 China Business Law, Regulations, and Ethics (Irregular) Business law in China that is relevant to managers; Chinese regulations particularly relevant to consumer products and retail; business ethics in China.

MBAD591V Capstone Project Definition (Irregular) (1-3) Identification of business processes for capstone project, including: estimation of the size of the opportunity, identification of key decisions, and proposal write up.

MBAD592V Capstone Project Plan (Irregular) (1-3) Second estimation of the size of the project benefit, identification of how the current process operates, assumptions identified, literature investigated, performance metrics, and Gantt chart for project.

MBAD593V Capstone Project Management (Irregular) (1-3) Management of the project, including frequent updates, milestone accomplishment, strategies to overcome challenges, and creation of an implementation plan.

MBAD594V Capstone Project Final Deliverables (Irregular) (1-3) Write up of entire capstone project, presentation of project, estimates of value, implementation plan, performance metrics, and change management plan.

ECONOMICS (ECON)

Gary Ferrier
Department Chair
402 Walton College of Business
479-575-ECON (3266)

Fabio Mendez
Ph.D. Program Director
465 Walton College of Business
479-575-6231

- University Professors Britton, Gay
- Lewis E. Epley Jr. Professorship in Economics Professor Ferrier
- Margaret Gerig and R.S. Martin Jr. Chair in Business Professor Farmer
- Professors Curington, Deck, Dixon, Horowitz, Ziegler
- ConocoPhillips Chair in International Economics and Business Associate Professor Kali
- Associate Professors Mendez, Reyes
- Assistant Professors Civelli, Gu, Hao, Jahedi
- Clinical Associate Professor Stapp
- Clinical Assistant Professor Embaye

Degrees Conferred:
M.A., Ph.D. (ECON)

Master of Arts in Economics

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. The requirements are (1) a bachelor's degree from an accredited institution with a satisfactory grade-point average, (2) a satisfactory score on the Graduate Record Examinations (GRE) and (3) satisfactory performance in the following courses: intermediate microeconomics, intermediate macroeconomics, statistics, two semesters of calculus, and linear algebra. Students from all academic backgrounds are encouraged to apply.

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 one year. 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: All master's students must satisfactorily complete the 30 hours of course work listed below. Students must have a 3.00 cumulative grade point average in order to graduate. If at any point, a student's cumulative GPA falls below a 3.00, the student will be placed on academic probation. A student with a cumulative GPA below 3.00 for two consecutive semesters will be dismissed from the program.

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 6623 Econometrics II or ECON 6633 Econometrics III
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 in preparation for 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.

Graduate Seminar (3 hours):

Students must register for at least one hour of graduate seminar each semester they are in residence.

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.

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.

Ph.D. in Economics

Prerequisites to Degree Program: Students may enter the program directly from a bachelor's degree or a master's 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. The requirements are (1) a bachelor's degree from an accredited institution with a satisfactory grade-point average, (2) a satisfactory score on the Graduate Record Examinations (GRE) and (3) satisfactory performance in the following courses: intermediate microeconomics, intermediate macroeconomics, statistics, two semesters of calculus, and linear algebra. Students from all academic backgrounds are encouraged to apply.

Requirements for the Doctor of Philosophy Degree: The doctoral program consists of

1. Core requirements
2. Candidacy
3. Field Examinations
4. Dissertation
5. Final Examination

Core Requirements: All doctoral candidates must satisfactorily complete the 39 hours of course work listed below. Students must also register for graduate seminar each semester they are in residence. Students must have a 3.00 cumulative grade point average in order to graduate. If at any point, a student's cumulative GPA falls below a 3.00 the student will be placed on academic probation. A student with a cumulative GPA below 3.00 for two consecutive semesters will be dismissed from the program.

ECON 5233 Mathematics for Economic Analysis
ECON 5533 Microeconomic Theory I
ECON 6233 Microeconomic Theory II
ECON 6243 Macroeconomic Theory II
ECON 5433 Macroeconomic Theory I
ECON 5613 Econometrics I
ECON 6623 Econometrics II
ECON 6633 Econometrics III
ECON 6713 Industrial Organization I
ECON 6723 Industrial Organization II
ECON 6813 International Macroeconomics
ECON 6823 International Development
ECON 6913 Experimental Economics

Note: The 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 may have substantially shorter programs.

Candidacy Examinations: Students must pass written examinations in microeconomics and macroeconomics. These exams will normally be given in the summer after a student's first year in the program. Each exam has three possible grades: Pass, Marginal Pass, and Fail. Students must earn at least a Marginal Pass on both exams and a Pass in at least one of the exams. A student will normally have two opportunities to pass each exam with the second opportunity typically occurring in January. If a student's exam scores are not satisfactory, all exams for which a grade of Pass was not earned must be retaken. Only the most recent grade will be used in determining if this requirement has been met. Students will normally have only two attempts to pass the candidacy exams. Failure to successfully complete this requirement will result in a student being dismissed from the program.

Field Examination: Ph.D. students will have two fields of study, which will normally be a) Industrial Organization and b) International Macroeconomics and Development. Other fields are possible with the approval of the Program Coordinator. A field will consist of 6 hours of specialized courses (numbered 6000 or above). Students will select one of their two fields as a major field and must pass a Field Examination in that area. This exam will normally be completed in the summer after a student's second year in the program. Failure to successfully complete this requirement will result in a student being dismissed from the program.

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) completion of an acceptable doctoral dissertation. Students must enroll in a total of 18 hours of dissertation credit.

Final Examination: The final examination is normally an oral defense of the student's dissertation.

Economics (ECON)

ECON4423 Behavioral Economics (Fa) Both economics and psychology systematically study human judgment, behavior, and well-being. This course surveys attempts to incorporate psychology into economics to better understand how people make decisions in economic situations. The course will cover models of choice under uncertainty, choice over time, as well as procedural theories of decision making. Prerequisite: ECON 2023 or ECON 2143.

ECON4433 Experimental Economics (Irregular) 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.

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 analysis, and dynamic optimization. Prerequisite: Graduate standing and MATH 2554 or equivalent.

ECON5243 Economics of Supply Chain & 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.

ECON5433 Macroeconomic Theory I (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 (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.

ECON5613 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. 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 AGECE 5613)

ECON5853 International Economics Policy (Irregular) 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 (Sp) Further development of macroeconomic models to include uncertainty and asset pricing theory. Application of macroeconomic models to explain real world situations.

ECON636V Special Problems in Economics (Sp, Su, Fa) (1-6) Independent reading and investigation in economics. May be repeated for up to 9 hours of degree credit.

ECON643V Seminar in Economic Theory and Research I (Fa) (1-3) May be repeated for up to 6 hours of degree credit.

ECON644V Seminar in Economic Theory and Research II (Sp) (1-3)

Independent research and group discussion.

ECON6533 Seminar in Advanced Economics I (Irregular) 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 (Irregular) 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. Prerequisite: ECON 5613 or AGECE 5613.

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 or AGECE 5613.

ECON6713 Industrial Organization I (Fa) This course will develop the theory of modern industrial organization. The latest advances in microeconomic theory, including game theory, information economics and auction theory will be applied to understand the behavior and organization of firms and industries. Theory will be combined with empirical evidence on firms, industries and markets. Prerequisite: ECON 5533 and ECON 6233.

ECON6723 Industrial Organization II (Sp) This course surveys firm decisions, including setting prices, choosing product lines and product quality, employing price discrimination, and taking advantage of market structure. It will also cover behavioral IO, which reconsiders the assumption that firms and consumers are perfectly rational and examines the role of regulation. Prerequisite: ECON 5233 and ECON 6253.

ECON6813 International Macroeconomics (Fa) This course covers open economy macroeconomics. It will cover static and dynamic models using continuous and discrete time techniques and computer simulations to cover the mainstream topics of international macroeconomics, including exchange rates, balance of payments, monetary models in open economies, and capital accumulation in an open economy. Prerequisite: ECON 5433 and ECON 6243.

ECON6823 International Development Economics (Sp) The course provides an introduction to graduate level Development Economics. It will introduce and analyze many of the prominent theories and empirical evidence of International Development. The class will be interactive with students reading, reviewing, and presenting seminal and frontier articles in the field. Prerequisite: ECON 5433 and ECON 6233.

ECON6913 Experimental Economics (Fa) The course develops advanced concepts in the use of controlled experiments to test economic theory and explore behavioral regularities relating to economics. The class focuses on the methodology of experimental economics while reviewing a variety of established results. Prerequisite: ECON 5533.

ECON700V Doctoral Dissertation (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

FINANCE (FINN)

Pu Liu
Department Chair
479-575-4505

Wayne Y. Lee
Ph.D. Program Director
479-575-4505

- J.W. Bellamy Chair of Banking Professor Dominick
- Garrison Chair in Finance and 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
- Clete and Tammy Brewer Professorship in Business Associate Professor Rennie
- Associate Professors Hearsh, Jandik
- Assistant Professors Fogel, Malakhov, Wang

Degree Conferred:

Ph.D. in Business Administration (BADM)

Ph.D. in Business Administration – Finance Concentration

Overview: The Ph.D. program in Finance prepares students for faculty positions at academic institutions or for professional careers in private industry and government. During their course of study, students receive specialized instruction in the areas of corporate finance, investments, and financial institutions. The conceptual knowledge and methodological skills necessary to conduct independent research are acquired through courses and individual apprenticeships with faculty.

Curriculum:

Finance (15 hours)

- FINN 6043 Finance Theory
- FINN 6133 Seminar in Investment Theory
- FINN 6233 Seminar in Corporate Finance
- FINN 6333 Empirical Research in Finance
- FINN 6733 Seminar in Financial Markets and Institutions

Economics (21 hours)

- ECON 5233 Mathematics for Economic Analysis (Summer)
- ECON 5533 Microeconomics Theory I (Fall)
- ECON 6233 Microeconomics Theory II (Spring)
- ECON 6253 Microeconomics Theory III (Fall)
- ECON 5613 Econometrics I (Fall)
- ECON 6623 Econometrics II (Spring)
- ECON 6633 Econometrics III (Spring)

Research Tools (6 hours) Choose 2 of the following courses

- STAT 5303 Probability Theory (Fall)
- STAT 5322 Statistical Packages
- STAT 5343 Stochastic Processes
- STAT 5353 Methods of Multivariate Analysis II (Spring)
- STAT 5333 Analysis of Categorical Response
- STAT 5383 Time Series Analysis

Student may take up to one research tool course approved by the Finance Department doctoral student adviser if the research tool course is not listed above.

Program Structure: The Ph.D. program in Finance requires 42 credit hours of coursework. Five seminars (15 credit hours) in financial theory and research are required. The remaining credit hours, distributed across two supporting areas, economics and research tools, are customized in consultation with the departmental doctoral program adviser. In addition, students must complete a research paper requirement, pass a written and an oral comprehensive exam, as well as successfully defend and conclude an approved doctoral thesis.

Finance (FINN)

FINN4013 Seminar in Personal Financial Planning (Sp) Explores financial planning function, including contact, data acquisition, plan development and implementation; covers all areas of personal financial planning including investments, insurance, taxes, and estate planning; addresses planning techniques and financial planning ethical issues; emphasis on case studies. Pre- or Corequisite: FINN 4733. Prerequisite: FINN 3003, FINN 3063, FINN 3623, and ACCT 3843.

FINN410V Special Topics in Finance (Irregular) (1-6) Explore current events, new developments and special topics in Finance not covered in other courses. Prerequisite: FINN 3013. May be repeated for up to 6 hours of degree credit.

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. Corequisite: ACCT 3723. Prerequisite: 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 and by invitation only.

FINN4233 Advanced Corporate Finance (Irregular) Addresses complex and multifaceted issues and problems in financial decision-making. Prerequisite: FINN 3603.

FINN4433 Real Estate Finance and Investment (Sp) Consideration of professional aspects of the real estate field. Emphasis is placed upon finance techniques and investment analysis. The focus is on commercial real estate. Brokerage, property management, appraisal, property development and current problems are also addressed. Students prepare a feasibility study on a commercial development project. Prerequisite: FINN 3933.

FINN450V Independent Study (Irregular) (1-3) Permits students on an individual basis to explore selected topics in finance, with the consent of instructor.

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 for credit.

FINN5303 Advanced Corporate Financial Management (Irregular) 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: FINN 511V or FINN 5223.

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 5223.

FINN541V Shollmier Investment Project (Sp, Fa) (1-3) 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. Prerequisite: FINN 5223 and FINN 5333. May be repeated for up to 9 hours of degree credit.

FINN5443 Retail Finance (Sp) 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

FINN5703 Multinational Business Finance (Irregular) Problems pertinent to managers of firms in multinational business environments, including international institutions, risks, investments and capital budgeting. Prerequisite: FINN 5203.

FINN6043 Finance Theory (Irregular) 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 (Irregular) Financial management of firm with emphasis on financial theory or firm, quantitative methods used in financial analysis, planning.

FINN6333 Empirical Research in Finance (Irregular) A study of recent empirically based research in finance.

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 up to 6 hours of degree credit.

FINN6733 Seminar in Financial Markets and Institutions (Irregular) 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.

FINN683V Contemporary Issues in Doctoral Colloquium (Sp, Su, Fa) (1-3) To explore and evaluate contemporary research issues in finance. Course content to reflect the most recent developments in theory and empirical research methodologies. Prerequisite: Doctoral student status and instructor consent. May be repeated for up to 18 hours of degree credit.

FINN700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: Candidacy.

INFORMATION SYSTEMS (ISYS)

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- David D. Glass Chair in Information Systems and Distinguished Professor Davis (F)
- George M. & Boyce W. Billingsley Chair in Information Systems and Distinguished Professor Venkatesh
- M.D. Matthews Chair in Information Systems Professor Cronan
- University Professors Douglas, Jones (T.W.)
- Walton College Professorship in Information Systems Professor Sabherwal
- Edwin & Karlee Bradberry Chair Professor Limayem
- Assistant Professors Setia, Serrano, Sykes
- Instructors Bristow, McDaniel, Mullins
- Visiting Instructors McDaniel, Shang

Degrees Conferred:

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

Master of Information Systems

The Master of Information Systems is designed to provide professional preparation for positions in business and government. It provides sufficient flexibility to meet the needs of students with various backgrounds and foster lifelong learning and innovation. Students may concentrate in one of four areas: Information Technology Management, Enterprise Resource Planning (ERP) Management, Enterprise Systems (ES) Management, or Software Engineering.

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 80 on the Internet-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 7 on the IELTS (speaking) sub-test or 26 on the Internet-based TOEFL (speaking) sub-test. Other admissions criteria can be considered on a case by case basis.

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 professional positions in business and public sector. 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.net, management information systems, systems analysis, and database.

To ensure that students acquire the skills necessary for career success, the MIS program strongly encourages all students to obtain additional training directly related to the MIS program prior to graduation. The MIS program considers this training an integral part of the curriculum and recommends that students work for up to one year in a position (or positions) which allow for the practical application of the theoretical principles taught in MIS courses.

Students who hold non-immigrant status in the United States in the F-1 or J-1 categories are responsible for coordinating any necessary authorization for employment with the Office of International Students and Scholars (ISS). F-1 and J-1 students are strongly advised to discuss training options with the MIS Program Director and the ISS office early in their program, and to make themselves aware of limitations and restrictions related to F-1 or J-1 employment authorization benefits.

Pre-MIS

ISYS 511V IT Toolkit and Skills Seminar

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 (15 hours):

Information Technology Management

ISYS 5503 Decision Support Systems

WCOB 5213 ERP Fundamentals

Computing Electives (9 hours) selected from approved ISYS and CSCE

Enterprise Resource Planning (ERP) Management

ISYS 5503 Decision Support Systems

WCOB 5223 ERP Configuration and Implementation

ISYS 5233 Seminar in ERP Development

Select 6 hours from:

ISYS 5133 E-Business Development

ISYS 5453 Introduction to Enterprise Servers

ISYS 5503 Decision Support Systems

ISYS 5843 Seminar in Bus. Intelligence and Knowledge Mgmt.

Enterprise Systems (ES) Management

ISYS 5503 Decision Support Systems
 ISYS 5453 Introduction to Enterprise Servers
 ISYS 5463 Enterprise Transaction Systems
 Select 6 hours from:
 ISYS 5133 E-Business Development
 WCOB 5213 ERP Fundamentals
 ISYS 5843 Seminar in Bus. Intelligence and Knowledge Mgmt.

Software Engineering Management

ISYS 5503 Decision Support Systems
 ISYS 5133 E-Business Development
 Select 9 hours from:
 ISYS 4333 O-O Technologies Seminar
 CSCE 4313 Programming languages
 CSCE 4323 Formal Lang and Comp
 CSCE 4513 Software Engineering
 CSCE 5323 Computer Security
 Approved ISYS or CSCE courses
 Electives: 6 hours

Total Hours: 30

Professional M.I.S. (Part-time) Program:

Pre-MIS

ISYS 511V IT Toolkit and Skills Seminar

Fall, Year 1

ISYS 5423 Seminar in Systems Development
 ISYS 5833 Data Management Systems

Spring

ISYS 5503 Decision Support Systems
 ISYS 5133 E-Business Development

Summer

WCOB 5213 ERP Fundamentals
 ISYS 5933 Global IS

Fall, Year 2

ISYS 5843 Seminar in Bus. Intelligence and Knowledge Mgmt.
 Concentration or Elective (3 hours)

Spring

Concentration or Elective (3 hours)
 ISYS 5133 E-Business Development

Electives are chosen by the student in consultation with the Master of Information Systems Program Director in the Department of Information Systems (ISYS). Approved electives (6 hours) may be any graduate course approved by the Master of Information Systems Program Director, but only three hours of ISYS courses are permitted.

Note: With the approval of the Master of Information Systems Program Director, any senior level ISYS course (ISYS 4000+) may be taken for graduate credit. CSCE is Computer Science 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.

Ph.D. in Business Administration – Information Systems Concentration

Overview

The objective of the Ph.D. in business administration with a concentration in information systems is to prepare students to conduct quality research in information systems as a faculty member at a research-oriented university

school of business. The program is designed to produce a graduate with an understanding of the necessary subject matter required to contribute educational and research expertise to the field of information systems. In addition to preparing students to be world-class researchers, the program seeks to prepare students to teach effectively in an information systems curriculum.

Requirements

Requirements for the Ph.D. in business administration with concentration in information systems include core courses and elective courses in information systems, research tools, and supporting fields. These 43 credit hours of courses are taken prior to advancing to candidacy and are broken down as follows: research tools (9 hours); ISYS core courses (21 hours); and supporting field courses (13 hours). Also, there is a requirement that students satisfactorily complete a one-hour Graduate Colloquium during the fall and spring semesters of each year when students are in residence on campus in pursuit of the degree. Following completion of the coursework, students must pass a comprehensive examination. The program also requires completion of 1st and 2nd year summer research projects, defense of a dissertation proposal, and successful defense of the dissertation (18 credit hours). Students are also prepared for a career in research through research assistantships, collaborative research projects with faculty members, colloquia, and classroom teaching and support.

Program Requirements

Research Tools: (9 hours)

ISYS 5203 Experimental Design
 ISYS 5623 Multivariate Analysis
 ISYS 5723 Advanced Multivariate Analysis

Information Systems Core Courses: (Select 21 hours)*

ISYS 6133 Survey of IS research
 ISYS 6233 IS Research Projects
 ISYS 6333 Individual-Level Research in IS
 ISYS 6433 Team-Level Research in IS
 ISYS 6533 Macro- and Meso-Level IS Research
 ISYS 6633 Systems Development
 ISYS 6733 Emerging Topics
 ISYS 6833 Theory Development
 ISYS 601V Graduate Colloquium

Supporting Fields: (13 hours)

In addition to the BADM 6111 Teaching Seminar and MGMT 6213 Research Methods Seminar, courses to meet this requirement will be determined in consultation with the ISYS Ph.D. program committee (courses must be at the Ph.D. level, unless otherwise approved by the ISYS Ph.D. program committee). These courses are normally taken outside the ISYS Department and are in the student's area(s) of interest.
 BADM 6111 Teaching Seminar (1 credit hour)
 MGMT 6213 Research Methods Seminar

Comprehensive Examination:

Written exam, research tools and IS (at the end of all coursework)
 Research proposal: 1 week take-home response to call for proposals
 Oral exam

Summer Research Requirements:

1st summer
 2nd summer

Dissertation Requirements:

Successful defense of Dissertation proposal***
 Successful defense of Dissertation***
 ***Minimum committee size: 4

Other Ph.D. Courses Taken: (9 hours maximum)

Students may take up to 9 hours of other Ph.D. courses, as necessary.

Masters Level Courses:

Students typically without an information systems background will be required to take some Masters courses prior to taking their comprehensive examinations. These courses do not count toward the Ph.D. degree and are taken to remedy deficiencies. The ISYS Ph.D. program committee will determine whether a student needs to take one or more of these courses. The specific courses are: ISYS 5423 Seminar in Systems Development, ISYS 5503 Decision Support Systems, and ISYS 5833 Data Management Systems.

Admission Requirements

In addition to the University's Graduate School and Walton College of Business' Graduate School of Business requirements, the ISYS Ph.D. program has the following requirement: Applicants are expected to have a background in information systems via prior courses in topics such as a programming language, systems analysis, design, and development, and database processing. Students without the background may also be admitted but will likely be required to take up to 3 masters level courses to remedy the deficiency.

Residence Requirement

There is a strong preference for students to be in residence — i.e., be full-time students with assistantship duties — during the entire program. Residence requirements are intended to ensure that every student has ample opportunity for the intellectual development that can result from a sustained period of intensive study and close association with 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 that comes 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.

After filing a Declaration of Intent to pursue the doctoral degree, a student must fulfill a residence requirement as outlined in the Graduate Catalog section on doctors of philosophy and education degrees on page 45.

Information Systems (ISYS)

ISYS4243 Current Topics in Computer Information (Irregular) 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: Junior standing. May be repeated for up to 6 hours of degree credit.

ISYS4373 Application Development with Java (Fa) 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 3293.

ISYS450V Independent Study (Sp, Fa) (1-3) Permits students on individual basis to explore selected topics in data processing and/or Quantitative Analysis.

ISYS511V IT Toolkit & Skills Seminar (Irregular) (1-3) Seminar in Information Systems solutions and concepts (such as applications development, VB.NET, analysis of problems and design of solutions via application systems, etc.) designed for students entering the MIS program—may not be used for MIS degree credit. Prerequisite: MIS Director approval. May be repeated for up to 3 hours of degree credit.

ISYS5133 E Business Development (Sp) 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 5110 (or equivalent).

ISYS5203 Experimental Design (Fa) ANOVA, experimental design, introduction to basis of statistics. Prerequisite: Graduate standing and WCOB 1033 or equivalent.

ISYS5233 Seminar in ERP Development (Irregular) 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. Pre- or Corequisite: WCOB 5223. Prerequisite: ISYS 5110 (or equivalent) and WCOB 5213. May be repeated for up to 6 hours of degree credit.

ISYS535V Information Technology Internship Experience (Sp, Su, Fa) (1-6) 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. Pre- or corequisite: MIS Director approval is required. May be repeated for up to 9 hours of degree credit.

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.

ISYS5423 Seminar in Systems Development (Fa) 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 5110 (or equivalent) and ISYS 3293 (or equivalent).

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.

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 5110 or equivalent.

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 students with the necessary understanding and skills to work in this type environment. Pre- or Corequisite: ISYS 5453 (or equivalent) or MIS Director approval. Prerequisite: ISYS 5110 (or equivalent).

ISYS5503 Decision Support Systems (Sp) 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 5110 (or equivalent).

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 nonparametric tests. Prerequisite: ISYS 5203 or equivalent.

ISYS5623 Multivariate Analysis (Sp) Principal component analysis, regression analyses. Prerequisite: ISYS 5203.

ISYS5713 Seminar in IS Topics (Irregular) Intensive seminar in selected information systems topics. Topical selection made with each course offering. Prerequisite: ISYS 511V or MIS Director approval. May be repeated for up to 9 hours of degree credit.

ISYS5723 Advanced Multivariate Analysis (Irregular) Factor analysis and other advanced techniques. Prerequisite: ISYS 5623.

ISYS5833 Data Management Systems (Fa) 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. Pre- or Corequisite: ISYS 5423. Prerequisite: ISYS 5110 (or equivalent).

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 or equivalent and ISYS 5833 or equivalent.

ISYS5933 Global Information Systems Seminar (Su) 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 and MIS Director approval.

ISYS5943 Management of Information Technology Seminar (Sp) 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. Prerequisite: ISYS 5423 and ISYS 5833.

ISYS601V Graduate Colloquium (Sp, Fa) (1-6) Presentation and critique of research papers and proposals.

ISYS6133 Survey of IS Research (Fa) This is an introductory seminar in information systems research for doctoral students. Its objective is to introduce participants to major streams of IS research and discuss many of the important roles and responsibilities of an IS researcher. Also, this course will play the important role of introducing participants to the research of the current IS faculty.

ISYS6233 IS Research Projects (Irregular) The students will understand the ideas underlying a scientific contribution; understand the practical challenges in designing and executing a study; Design and execute a study; Write an empirical journal article.

ISYS6333 Individual-level Research in IS (Irregular) This course aims to expose students to individual-level research in IS. It provides a window into major streams of individual-level research in IS and reference disciplines. May be repeated for up to 18 hours of degree credit.

ISYS636V Special Problems (Irregular) (1-6) Independent reading and research under supervision of senior staff member. May be repeated for up to 6 hours of degree credit.

ISYS6423 Structural Equation Modeling (Irregular) Structural equation modeling using current tools, such as AMOS.

ISYS6433 Team-level Research in IS (Irregular) This course aims to expose students to team-level research in IS. It provides a window into major streams of team-level research in IS and reference disciplines.

ISYS6533 Macro- and Meso-level IS Research (Irregular) This course aims to expose students to research at the macro- and meso-levels. For example, it could provide a window into major streams of organizational-level research in IS and reference disciplines. Topics could also include: change management, ERP research models, implementation, applications, and successes/failures, and ERP simulation models. Other topics that fall within the purview of the course are: large-scale technology and process innovations in organizations--e.g., software development process innovations and RFID will be examined at various levels (e.g., organizational).

ISYS6633 Systems Development (Irregular) The course provides an in-depth study of systems development as an area of research, understanding of the theoretical and conceptual foundations, insight into the current state of the research area, utilizes both IS and reference discipline literature as appropriate, guidance for conducting research projects and producing publishable research, an opportunity to work on cutting-edge research.

ISYS6733 Emerging Topics (Irregular) Various emerging topics, such as RFID applications and RFID supply chain, ethical decision models, behavioral modeling, piracy and privacy issues, and virtual worlds.

ISYS6833 Theory Development (Irregular) To acquire theory development and writing skills, to understand challenges in developing and writing theory sections of papers, and to discuss approaches to writing good empirical journal articles. This course is suited for all social sciences students and is particularly appropriate for students conducting behavioral research in the business disciplines.

ISYS700V Doctoral Dissertations (Sp, Su, Fa) (1-18) Prerequisite: Candidacy.

MANAGEMENT (MGMT)

Alan Ellstrand
Department Chair
402 Walton College of Business
479-575-4007

Vikas Anand
Ph.D. Program Director
407 Walton College of Business
479-575-6232

- John H. Tyson Chair in Management Distinguished Professor Gupta
- William R. and Cecilia Howard Chair in Management Professor O'Leary-Kelly (A.),
- Raymond F. Orr Chair in Management Professor Delery
- Charles C. Fitchner Chair Professor Ellstrand
- Sam M. Walton Leadership Chair Professor Worrell
- Walton College Professorship in Sustainability Professor Johnson
- Cecil & Gwendolyn Cupp Applied Professorship in Entrepreneurship Associate Professor Reeves
- Associate Professor Anand
- Assistant Professors Breaux, Kish-Gephart, Rosen
- Instructors Newman, Pullen, Zweig

Degree Conferred:

Ph.D. in Business Administration (BADM)
(See Business Administration)

Ph.D. in Business Administration – Management Concentration

Management Content Core Requirements

MGMT 6113 Seminar in Organizational Behavior

MGMT 6123 Seminar in Organization Theory

MGMT 6133 Seminar in Strategy Research

MGMT 6233 Seminar in Human Resource Management

Supporting Fields

Courses for the supporting fields requirement are selected in consultation with the student's Ph.D. Advisory Committee. All courses taken for the Supporting Fields must be at the graduate level and/or taken for graduate credit. Statistics and methods classes cannot be used to fulfill the Supporting Fields requirement. A minimum of 6 hours and a maximum of 9 hours are to be taken in Management. These hours may include MGMT 6223, Special Topics in Management, and MGMT 636V, Special Problems.

Research Tools

Courses used to meet the Research Tools requirement will be selected in consultation with the student's Ph.D. Advisory Committee and should support the student's program of study. The courses should provide the student with a knowledge of advanced descriptive and inferential statistics, research design, and research methods.

Comprehensive Exam

Students will be required to take a comprehensive examination as a requirement of the PhD program in the Management Department. The exam will be administered over a three day period with the first day focusing on questions concerning the primary and secondary content areas, the second day being a day off to study a research article that will be covered on the research methods exam and the third day covering research methods. Successful completion of both parts of the comprehensive exam are required for admission to candidacy.

The exam will consist of three parts:

Content: Students will have questions from the two content areas they identified. There will be more questions on the primary area than the secondary area. Students will have some opportunity to choose among the questions. There will be some mandatory questions

Methods: All students will have the same methods questions. One part of the methods exam will be an article that students review *a priori* and critique. Students will have some opportunity to choose among the questions. There will be some mandatory questions.

Specialty Area: Each student taking the comprehensive exam will select a specialty area of emphasis and a management department faculty willing to sponsor that area. This area is one that the student is expected to be an expert in, and ideally, linked to his or her future dissertation area. The last part of the comprehensive exam will comprise questions that are based on the specialty area.

Management (MGMT)

MGMT5213 Business Foundations for Entrepreneurs (Sp) Introduction to the fundamental business concepts an entrepreneur needs to know to evaluate and launch a successful new venture. Topic areas include recruitment, selection, motivation and management of employees, market analysis and the marketing mix, financial strategies and accounting for funds, economic considerations, and the management of operations. Prerequisite: Graduate standing.

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 for credit.

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.

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. Students are required to complete summer assignments before the course begins in the fall semester. Prerequisite: MGMT 5213 or an undergraduate degree in business or permission of the instructor.

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.

MGMT5373 International Management: Globalization and Business (Su) This course provides students with guidance on understanding the forces unleashed by increasing globalization of the world and how to understand and cope with the issues involved in managing large and small companies in multiple geographic and cultural markets.

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.

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 up to 3 hours of degree credit.

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 up to 6 hours of degree credit.

MGMT700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: Candidacy.

MARKETING (MKTG)

Jeff Murray
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302 Walton College of Business
479-575-4055

Steve Kopp
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323 Walton College of Business
479-575-3228

- Wal-Mart Chair of Marketing Professor Burton
- Wal-Mart Lecturer in Retailing Professor Jensen
- R.A. and Vivian Young Chair of Business Administration Professor Murray
- Oren Harris Chair of Transportation Professor Ozment
- Garrison Chair in Supply Chain Management Professor Waller
- Professor Howlett
- Associate Professors Ashton, Kopp, Rapert, Stassen
- Assistant Professors Kelting, Soster, Smith
- Clinical Associate Professor Jensen (M.)
- Instructors Cole, Cox

Degrees Conferred:

Ph.D. in Business Administration (BADM)

Ph.D. in Business Administration – Marketing Concentration

The Ph.D. in Business Administration with a Marketing Concentration allows students to concentrate within one of three areas: channels (e.g., retail, logistics, transportation, supply chain management), management (e.g., strategy, international, relationship marketing), or communications (e.g., consumer behavior, advertising, promotion). The student's concentration will determine the courses taken in fulfilling the supporting fields requirement and the specialization for the comprehensive examination.

Program Requirements

Generally, the Ph.D. Program in Business Administration with a Marketing Concentration is comprised of 60 credit hours. Up to 6 credit hours of prior coursework may be applied to the requirements for the Marketing Concentration with the recommendation and consent of the student's Ph.D. Program Advisory Committee.

Marketing Tools (18 hours)

MKTG 6433 Seminar in Research Methods,
ISYS 6333 Research Seminar, and

12 hours of electives to be determined in consultation with the Ph.D. Program Advisory Committee.

Marketing Core (6 hours)

MKTG 6443 Seminar In Marketing Theory

MKTG 6413 Special Topics in Marketing (must be consumer behavior content)

Supporting Fields (18 hours)

Courses for the supporting field requirement are made in consultation with the student's Ph.D. Program Advisory Committee. All courses taken for the supporting fields must be at the graduate level and/or taken for graduate credit. A minimum of nine hours should be taken in graduate research seminars.

Dissertation (18 hours)

A dissertation will be written under the guidance of the marketing faculty. The dissertation committee consists of a minimum of 3 graduate faculty members. One graduate faculty member outside the Marketing Department may be chosen for this committee depending on the dissertation topic.

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 for credit.

MKTG5333 Retailing Strategy and Processes (Sp) 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 Management (Irregular) 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 for credit.

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 up to 6 hours of degree credit.

MKTG6413 Special Topics in Marketing (Irregular) Seminar in special topics in marketing. Topics vary depending upon the instructor. May be repeated for up to 3 hours of degree credit.

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 up to 3 hours of degree credit.

MKTG6443 Seminar in Marketing Theory (Irregular) Comprehensive survey and critical review of the history of marketing thought and contemporary schools of thought in marketing discipline. In-depth 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.

MKTG700V Doctoral Dissertation (Sp, Fa) (1-18) Prerequisite: Candidacy.

SUPPLY CHAIN MANAGEMENT (TLOG)

Matt Waller
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479-575-8741

Chris Hofer
Ph.D. Program Director
475F Walton College of Business
479-575-6154

- Oren Harris Chair of Transportation Professor Ozment
- Garrison Chair in Supply Chain Management Professor Waller
- Associate Professors Aloysius, O'Leary-Kelly (S.),
- Assistant Professors Hofer (C.), Hofer (A.)

Degrees Conferred:

Ph.D. in Business Administration (BADM)

Ph.D. in Business Administration – Supply Chain Management Concentration

Concentration

The Ph.D. Program in Business Administration with a Supply Chain Management Concentration allows students to concentrate within one of two areas: logistics or global supply chain management. The student's con-

centration will determine the courses taken in fulfilling the supporting fields re-requirement and the specialization for the comprehensive examination.

Program Requirements

Generally, the program is composed of 60 credit hours. Up to 6 credit hours of prior coursework may be applied to the requirements for the supply chain management Concentration with the recommendation and consent of the student's Ph.D. Program Advisory Committee.

Tools (18 hours)

TLOG 643V Seminar in Research Methods

12 hours of electives to be determined in consultation with the

Ph.D. Program Advisory Committee

Supply Chain Management Core (12 hours)

TLOG 5633 Retail Supply Chain Management

TLOG 5653 Global Logistics and Supply Chain Management

TLOG 5643 Transportation Strategy

TLOG 5673 Modeling Retail & Consumer Products Supply

Chain Management

Supporting Fields (12 hours)

Courses for the supporting fields requirement are made in

consultation with the student's Ph.D. Program Advisory

Committee. All courses taken for the supporting fields must

be at the graduate level and/or taken for graduate credit. A

minimum of nine hours should be taken in graduate research

seminars.

Dissertation (18 hours)

A dissertation will be written under the guidance of the supply

chain management faculty. The dissertation committee consists

of a minimum of 3 graduate faculty members. One graduate

faculty member outside the Department may be chosen for this

committee depending on the dissertation topic.

Supply Chain Management (SPCM)

SPCM560V 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 up to 3 hours of degree credit.

SPCM5633 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.

SPCM5643 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.

SPCM5653 Global Logistics and Supply Management (Irregular) 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.

SPCM5663 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.

SPCM5673 Modeling Retail & Consumer Products Logistics (Irregular) 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: SPCM 5633.

Fee and General Information for 2012-13

Educational expenses will 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 for tuition and fee estimation is available at <http://treasurer.uark.edu/Tuition.asp?pagestate=Estimate>.

Financial obligations to the University must be satisfied by the established deadlines. Payment may be made at the University Cashier's Office in the Arkansas Union, Room 214, by cash, personal check, money order or certified check. Echeck (electronic check) and credit/debit payments are made online at <https://isis.uark.edu/>. If you pay with a debit or credit card, there is a convenience fee charged of 1.7 percent.

Acceptance of payment for fees does not imply academic acceptance to the University.

ESTIMATED NECESSARY EXPENSES FOR AN ACADEMIC YEAR

Estimates of necessary expenses for one semester of the 2012-13 academic year for a typical graduate student taking 24 credit hours at the University of Arkansas:

	Graduate Resident	Graduate Non-Resident
Tuition ¹	\$8,388.00	\$19,842.00
University Fees ²	1,086.00	1,086.00
Books	1,278.00	1,278.00
Subtotal	10,752.00	22,206.00
Room ³	16,214.00	16,214.00
TOTAL ⁴	\$26,966.00	\$38,420.00

1. Students enrolled in College of Business courses are charged differential tuition at \$104.84 per credit hour more than standard graduate in-state tuition.

2. University fees per year include the following student-initiated and student-approved fees:

Student Activity fee \$2.64/credit hour	63.36
Student Health fee, calculated at \$7.25/credit hour,	174.00
Media fee \$0.69/credit hour	16.56
Transit fee \$2.53/credit hour	60.72
Network Infrastructure and Data Systems fee (\$11.97/credit hour)	287.28
Facilities Fee, calculated at \$10.00/credit hour	240.00
College of Arts and Sciences Fee (\$10.19/credit hour)	244.56

3. Room amount is provided by the cost of attendance as listed on the student budget from Financial Aid.

4. Budget amounts were adjusted for rounding to accommodate ISIS budgetary rules.

When paying tuition, room and board, and associated fees, anticipated financial aid for a current semester may be deducted when it is listed as anti-

pated aid on ISIS. 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.

The latest information regarding costs and other aspects of University life may be obtained by calling or writing the Office of Graduate and International Recruitment, 346 N. Arkansas Avenue, 1 University of Arkansas, Fayetteville, AR 72701. In Arkansas, call (479) 575-6246; from outside of Arkansas, call toll-free 1-866-234-3957.

TUITION FEES

Students classified as "in-state" for fee payment purposes are assessed tuition. Students classified as "out-of-state" for fee payment purposes are assessed additional non-resident tuition.

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 at the end of this chapter of the catalog. Out-of-state students who question their residency classification are encouraged to contact the Registrar's Office, 146 Silas H. Hunt Hall, for more information about residency classification review procedures.

Academic Year

Graduate students are assessed tuition fees of \$349.47 per credit hour each semester. Graduate students with out-of-state residency status are assessed tuition of \$826.77 per credit hour. Graduate students enrolled in the Walton College of Business courses are charged tuition at \$454.31 per credit hour and \$1,074.80 per credit hour for students with out-of-state residency.

Summer Sessions

Graduate students are assessed tuition fees of \$349.47 per credit hour. Graduate students with out-of-state residency status are assessed tuition of \$826.77 per credit hour. Graduate students enrolled in the Walton College of Business courses are charged tuition at \$454.31 per credit hour and \$1,074.80 per credit hour for students with out-of-state residency.

FEE ADJUSTMENTS

Academic Semesters and Summer Sessions

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 (see chart below),

less an Administrative Withdrawal fee of \$45. Students who officially withdraw from a summer session or who drop classes in the summer also receive a cancellation of fees (see chart below).

ADJUSTMENTS OF TUITION AND FEES	
Adjustment Percentage	If withdrawn
100%	before the first day of the semester/session
90%	through the first 10% of days in the semester/session
80%	through the second 10% of days in the semester/session
70%	through the third 10% of days in the semester/session
60%	through the fourth 10% of days in the semester/session
50%	through the fifth 10% of days in the semester/session
40%	through the sixth 10% of days in the semester/session

Student Invoices

Students who pre-register for a semester will be invoiced approximately three weeks prior to the first day of classes. The Treasurer's Office will send out an e-mail notification when the student invoices are available on ISIS. You will log into ISIS at <http://isis.uark.edu>, navigate to the Finances section in your Student Center, and click the 'Student Invoice' link located under the My Account section.

Late Fees

Students who register for the fall 2012 and spring 2013 semesters are required to pay all charges by the posted payment deadline. Students who fail to pay all charges or who fail to 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 an additional late payment fee equal to the outstanding balance, not to exceed \$50.00.

The late fee will not be waived because an invoice was not received.

Disbursement of Refunds

Disbursement of refunds due to overpayments by scholarships, loans, and/or grants will begin approximately five (5) days prior to the start of classes.

Checks will be mailed to the student's permanent address unless a check address has been established on ISIS. Students may also receive a refund through direct deposit. Sign up for direct deposit through the Student Center on ISIS. The link is located beneath "account inquiry" on the left side of the screen.

Addresses

Students may create a check address, which will be used specifically for overpayment checks. This address may be created in addition to the local and permanent addresses. If a check address is not created, the default address will be the permanent address. The student may change their address on the ISIS Web site in the Student Center.

TEACHING EQUIPMENT AND LABORATORY ENHANCEMENT FEES

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 (see chart below).

TEACHING EQUIPMENT AND LABORATORY ENHANCEMENT FEES	
College or School	Per Credit Hour Fee
Agricultural, Food and Life Sciences	\$ 16.00
Architecture	20.36
Arts and Sciences	10.19
Business	21.30
Education and Health Professions	10.70
Engineering	36.48

FEES*		
Title	Description	Amount**
FACILITIES FEE	Provides support dedicated specifically to campus facilities needs, including major projects and deferred maintenance.	10.00
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.	.69
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. Also provides support for upgrades and replacement of the student information system.	11.97
STUDENT ACTIVITY FEE	Empowers the Associated Student Government (ASG) to make funding available to over 300 Registered Student Organizations and program activities on campus to develop lasting friendships and leadership abilities and provide all students with a unique opportunity to participate in cultural, social, educational, and recreational events throughout the year.	2.64
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.	7.25
TRANSIT FEE	Helps fund the Razorback Bus Transit System, which services the campus and neighboring community year round.	2.53

* Assessed each academic semester for which the student is enrolled: fall, spring, and summer
 **per credit hour

STUDENTS CALLED INTO ACTIVE MILITARY SERVICE

When a student or student's spouse is activated for full-time military service during a time of national crisis and is required to cease attending the University of Arkansas without completing and receiving a grade in one (1) or more courses, they shall receive compensation for the resulting monetary loss as provided by Fayetteville Policy 504.2. To be eligible for the compensation, the student must provide, prior to activation or deployment for military service, an original or official copy of the military activation or deployment orders to the Registrar. A student whose spouse is a service member shall provide proof of registration with the Defense Enrollment Eligibility Reporting System (DEERS) of the Department of the Defense that establishes that dependent

children reside in the household of the student and the service member. Upon leaving the University of Arkansas because of active duty or deployment, the student may choose one of three compensatory options. The student may officially withdraw and receive full adjustment and refund of tuition and non-consumable fees for the term involved; the student can remain enrolled and arrange for a mark of "Incomplete" for each class and finish the courses twelve (12) months after deactivation; or the student may receive free tuition and fees for one (1) semester after deactivation. For more detailed information, refer to Fayetteville Policy 504.2

PROGRAM/SERVICE SPECIFIC FEES	
English Language Placement Test (ELPT)	\$15.00
Graduation fees:	
Masters' Degree and Education Specialist	85.00
Master's Thesis	55.00
Ph.D. and Ed.D. Degree	95.00
Dissertation Fee	65.00
I.D. Card — First card	22.00
Each replacement card	18.00
Returned Check Fee	30.00
Installment Payment Plan	25.00
International Graduate Orientation Fee	40.00
International student (non-immigrant) application fee	50.00
International student per semester service fee (non-immigrants)	85.00
Sponsored Student Management Fee	300.00
International Visiting Student Program Fee	250.00
Late payment:	
On fifth day of classes if balance has not been paid	50.00
Additional fee at Nov. 30, April 30, and July 31 for fall, spring, and summer, respectively, if payment has not been made	50.00
Mandatory international student health insurance	1334.00/year
Graduate Application Fee	40.00
Graduate Document Processing Fee	25.00
Infant Development Center for UA Student Families: (40 hrs/week)	
Materials per semester	35.00/semester
Infants, Toddlers an Preschool	250.00/week
Parking Permit (per vehicle)	
Remote Student	54.78
Resident Reserved	81.45
Parking Garage Reserved	528.04
Motorcycle	719.76
Scooter	54.78
	7.42
Residence Hall nonrefundable application fee	35.00
Spoken Language Placement Test (SPLT)	65.00
Test Handling Fee	15.00
TOEFL	60.00
Transcript Fee - Official Copy	5.00
Miller Analogies Test (MAT)	70.00
Withdrawal from the University fee	45.00

COLLEGE/COURSE SPECIFIC FEES	
COLLEGE OF AGRICULTURAL, FOOD AND LIFE SCIENCES	
Fifth-year Internship Fee (M.A.T.) AGED 575V	\$100.00/semester
Agricultural and Extension Education Fee AGME 4973	\$3.00/credit hour
Apparel Studies Laboratory Fees HESC 1023, 1053, 2013, 2053, 3003, 4033, 4063	\$15.00/semester
School of Human Environmental Sciences Fee HESC 1411L, 2111L, 2403, 2433, 3401L, 4103, 4332, 4332L, 4342, 4342L, 4472, 4472L, 4373	\$15.00/semester
Teaching Internship Fee AGED 475V	\$100.00/semester
COLLEGE OF ARTS AND SCIENCES	
Fifth-year Internship Fee (M.A.T.) ARED 476V, MUED 451V	\$100.00/semester
COLLEGE OF EDUCATION AND HEALTH PROFESSIONS	
Advanced Clinical Practicum CDIS 528V	\$50.00/credit hour
Counseling Practicum Fee CNED 5343, CNED 6711	\$25.00/credit hour
Counseling Internship Fee CNED 574V CNED 674V section 1	\$25.00/credit hour
Fifth-year Internship Fee (M.A.T.) CIED 508V, CIED 514V, CIED 528V, PHED 507V, CATE 5016	\$225.00/semester
Internship for Communication Disorders CDIS 578V	\$100.00/semester
Internship Program in Education Leadership EDLE 574V, EDLE 674V	\$25.00/semester
Off-Campus Practicum: Public School Site CDIS 548V	\$50.00/semester
Kinesiology Course Supply Fee KINS 3533, 5593	\$3.33/credit hour
Curriculum Instruction Education Internship Fee CIED 514V, CIED 528V, CATE 5016	\$15.00/credit hour
Student Teaching Supervision PHED 407V	\$75.00/credit hour
Outdoor Adventure Leadership Fee RESM 4023	\$33.33/credit hour
Special Education Lab fee, Practicum CIED 532V	\$25.00/credit hour
COLLEGE OF ENGINEERING	
Off-Campus Engineering Graduate Courses	\$250.00/credit hour
Distance Technology Fee	\$50.00/credit hour
Operations Management Tuition Distance Technology Fee	\$250.00/credit hour \$50.00/credit hour

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-state tuition) 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, although some departments may require their graduate assistants to maintain a higher grade point average. 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 if on summer appointment. For the full policy, see the Graduate School Handbook, available on the Graduate School Web site at <http://grad.uark.edu/>.

Master's students may hold a graduate assistantship for no more than four major semesters; a doctoral student may hold a graduate assistantship for no more than eight major semesters; a student who enters a doctoral program with only a baccalaureate degree may hold a graduate assistantship for no more than ten major semesters. The department/program may petition the Graduate School for an extension to these time limits, on a case by case basis.

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 funds a limited number of fellowships to qualified under-represented students who enroll in an on-campus program at the University of Arkansas, Fayetteville campus.

Contact the Graduate School, 346 N. Arkansas Ave., (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 other Graduate School 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: Post 911, 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

Arkansas residents who are 60 years of age or older and show proper proof of age may choose to have tuition and fees waived under the senior citizen waiver of fees. Admission and enrollment under these conditions is open only on a "space available" basis in existing classes and students choosing to use this waiver may not register until just prior to the beginning of the term.

ROOM AND BOARD

University Housing

(Rates are subject to change)

Housing for married students, students with family status, nontraditional, graduate, and law students is limited and requires early application.

Summer rates for room and board in University residence halls with unlimited meal plans for 2012 summer sessions are \$32.69 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 or check <http://offcampushousing.uark.edu/>.

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, Hotz Hall, Ninth Floor, (479) 575-3951.
- For parking services fees, charges, and refund policies contact: Parking and Transit, Administrative Services Building, 155 Razorback Road, (479) 575-3507.
- For all other fees, charges, and refunds, contact the Treasurer’s Office at 214 Arkansas Union, 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 Resources and Facilities

ENHANCED LEARNING CENTER

The Enhanced Learning Center is designed to provide assistance to all University of Arkansas students in meeting their academic goals here and beyond. The center's goal is for every University of Arkansas student who needs or wants academic assistance to participate in the programs and services of the center without hesitation or barrier. Almost 8,000 students took advantage of the center's programs last year including:

- Tutoring in a variety of subjects (math, the sciences, English, foreign languages, composition and other courses taught throughout the University);
- Supplemental instruction in math and the sciences;
- Study skills workshops;
- Math and writing resources;
- Study rooms; and
- State-of-the art computers.

Center partners include the Math and Tutoring Resource Center (Science Engineering Building); Mullins Library; and University Housing. These partnerships allow the Enhanced Learning Center to deliver academic-success services to students in a variety of locations and formats. For all services, see elc.uark.edu and qwc.uark.edu

The Enhanced Learning Center has two primary locations: The E.L.C., which is on the Garden Level of Gregson Hall and focuses on math, the sciences, world languages, and the social sciences; and the Quality Writing Center, which is located in 316 Kimpel Hall and focuses on both undergraduate- and graduate-level writing assistance.

Enhanced Learning Center satellites are located in Futrell Hall, Mullins Library, and the Freshman Engineering Center. Search for specific times, locations and tutors on the ELC website at <http://elc.uark.edu>. Other satellite locations are in Mechanical Engineering, Mullins Library and the Freshman Engineering Center. Check the Enhanced Learning Center's website for tutor and subject availability.

Contact the Enhanced Learning Center by phone at 479-575-2885 or visit the center's website at <http://elc.uark.edu/>.

INFORMATION TECHNOLOGY SERVICES

University of Arkansas IT Services provides information technology leadership and support for academics, research, and public services. A variety of services are hosted by IT Services, including email, the campus network, wireless access, technical support, computer labs, the online student information system, and the learning management system. Student-centered technology services are funded by the Student Technology Fee, assessed by the Associated Student Government and managed by IT Services.

The campus network offers two wireless options for laptops and other mobile devices. UA Secure is an encrypted, secure network for UARK users, providing full access to all online services. UA Wireless is a guest network designed to provide anyone with Internet access on campus. For security, some services are blocked when connecting with UA Wireless.

Email service for students at the University of Arkansas is provided by Google. Students can configure various email applications to connect to email.uark.edu, including Outlook, OS X Mail, smartphone apps, and open-source applications. New or returning students can refer to the Get Started section of <http://its.uark.edu> for information on activating a UARK account and setting up a personal computer for access to email and wireless.

General Access Computing Labs (GACLs) offer over 300 Windows and Mac computers for use by UARK users. Labs are open during day and evening hours, including weekends, and some are open 24/7. GACLs are located in the Arkansas Union, Mullins Library, J.B. Hunt Center for Academic Excellence, Administrative Services Building (ADSB), and Northwest Quad. PrintSmart, the GACL printing system for students, provides a printing quota equivalent to 700 single-sided black and white pages per student per semester.

Laptops with GACL software installed are available for checkout along with digital cameras, video recorders, and microphones, to students with a University ID at the Student Technology Center in the Arkansas Union. Laptops are also available for checkout at Mullins Library. Students can also work from anywhere 24/7 using VLab at <http://vlab.uark.edu>, a virtual Windows 7 desktop providing real time access to GACL software from their own computers.

The Student Technology Center houses the Gaming Studio, the Digital Media Lab, a tech lounge, and a team room. Students can receive individual tutoring and technical support for multimedia projects working on a number of high-end digital project workstations with a wide range of multimedia software packages in the Digital Media Lab or meet with friends for work or play in the tech lounge or Gaming Studio.

The Faculty Technology Center in Gibson Annex assists faculty in finding and using effective technological tools to enhance classroom learning. The Center's staff works with faculty to support classroom initiatives that involve students using technology. The university's learning management system, Blackboard Learn, is supported by the Center. Other systems, such as Blackboard Collaborate and Echo360, integrate with Blackboard Learn for collaboration, communication, and lecture capture. Technical support for Blackboard Learn, Blackboard Collaborate, and Echo360 is available through the Center.

The Help Desk provides technical support to students, faculty, and staff via telephone at 575-2905, email at helpdesk@uark.edu, or through the online AskIT system at <http://askit.uark.edu>. A satellite Help Desk, providing one-on-one technical support and phone support, is located in the Arkansas Union near the entrance to the General Access Computing Lab.

Symantec AntiVirus software downloads are available free of charge from the IT Services website to all university users. Installation is required for all computers accessing the university network, and students living in residence halls are required to install Symantec to gain access to ResNet, the university's residence hall network. See the Get Started section of <http://its.uark.edu> to get Symantec.

A variety of collaborative technologies are available through IT Services, providing members of the university community with the tools to collaborate in and out of the classroom, on campus, and around the globe, including:

- UA Chat offers instant messaging services between UARK users, as well as

MSN, Yahoo!, ICQ, Google, and AIM contacts. Lync provides instant messaging, including audio and video, for faculty and staff.

- Blackboard Collaborate web-based conferencing allows participants to see via web cam, hear and ask questions via voice messaging, collaborate by sharing documents and presentations, discuss in real time, or use a common whiteboard.
- WordPress offers personal web and blogging space for all UARK users.
- Microsoft SharePoint is a web-based application that allows UARK users to create team web pages, manage projects, share documents and calendars, host discussion, create surveys, assign tasks, and control workflow.
- DropboxIT offers a secure online file sharing facility for exchanging large files on and off campus.
- Listserv mailing lists allow for group email communication and provide web-based archives.

Students, faculty, and staff have access to information technology resources on campus through a 10-billion-bits-per-second connection to the fiber-optic National LambdaRail and Internet2 networks. Each year, IT Services upgrades its computer systems, networks, and information system resources to ensure that all information technology at the university is on par with other doctoral-granting research universities.

MULTICULTURAL CENTER

The Multicultural Center is here to welcome students to the Razorback family at the University of Arkansas. The Multicultural Center is a department that enhances the student academic experience by preparing them for life in a rich and diverse society. The Multicultural Center is committed to providing an optimal learning environment that promotes cross-cultural interaction among all students by collaborating with university and community constituents to create educational, cultural, and social programs.

The Multicultural Center can be used for educational programming, art displays, and cultural exhibits. Students are encouraged to take advantage of the mentoring programs within the Multicultural Center and the educational and entertainment resources that include books, video and board games, and study areas. The Multicultural Center is located on the fourth floor of the Arkansas Union in Room 404. Contact information: 479-575-8405; Web: multicultural.uark.edu.

QUALITY WRITING CENTER

The Quality Writing Center provides face-to-face and online tutorials for undergraduate and graduate students who want to improve their writing. Clients make appointments via the center's web-based scheduling system (<http://qwc.uark.edu>). The main facility is in 316 Kimpel Hall, and a satellite center is located on the Mullins Library ground floor.

Graduate tutors help clients with any writing project. The center's staff of undergraduate peer tutors assist students with freshman composition assignments.

Quality Writing Center tutors take a non-directive approach, allowing students to maintain ownership of their writing and to control the important editorial decisions that improve their drafts. The tutors provide assistance to students at any stage of the writing process: brainstorming, pre-writing, outlining, drafting, and revising.

The center's website at <http://qwc.uark.edu> has 40 handouts covering a wide variety of composition and grammar issues.

SERVICES FOR INTERNATIONAL STUDENTS AND SCHOLARS

The office of International Students and Scholars strengthens the University of Arkansas as an active member of the international community. The office provides pre-arrival assistance and a comprehensive orientation program for newly admitted international students each semester. Cross Cultural Mentors provide one-on-one contact and group activities for new international students during their first semester, assisting them in their adjustment to the academic community and the Fayetteville/

Northwest Arkansas area. The office provides services such as immigration advising, employment authorization, non-resident tax filing assistance, and other programs and services that help students and scholars reach their academic and personal goals and make their time at the University of Arkansas more productive and enjoyable.

The office administers outreach programs that give students and scholars opportunities to learn about U.S. life and culture while enriching the community's knowledge and appreciation of diverse populations and cultures. These are: the iFriend and Global Greeks Programs, which pair international students and scholars with local families and current UA students who share American culture, daily life, and special activities with students; the Conversation Club program, which provides students with a small-group setting in which to practice conversational English with native speakers; the International Culture Team, a group whose members speak or share other skills and talents through educational presentations throughout the community, representing their home countries and cultures; and American Field Trip Program, which takes international students and scholars to local venues to learn about the diverse people who call Arkansas home.

The office sponsors various events including: the celebration of International Education Week each fall, and annual seminars for immigration attorneys. A number of registered student organizations specific to various country, culture, or language groups are linked with the office including the International Students' Organization (ISO), a group for U.S. and international students, which organizes events such as the International Bazaar and an annual banquet.

The Office of International Students and Scholars is in Holcombe Hall, Room 104; phone 479-575-5003; fax 479-575-7084; e-mail iss@uark.edu; Web: iss.uark.edu.

STUDENT SUPPORT SERVICES

The department of Student Support Services is designed to provide a powerful combination of programs and services to students who are first-generation, and/or modest-income, and/or individuals with disabilities. The services provided by Student Support Services place an emphasis on individual assessment, counseling, advising, and skill building. Some of these services include: academic/financial/personal counseling, financial scholarships, social etiquette instruction, career and graduate school preparation, academic/cultural enrichment, assistance with tutoring, and mentorship. The overarching goal of the University of Arkansas Student Support Services program is to empower students, assist them in achieving academic excellence, and seeing them through to graduation.

Student Support Services is a department in Diversity Affairs. The office is located on the Garden Level of Gregson Hall. For more details, call Student Support Services at 479-575-3546 or visit the website at <http://sss.uark.edu/>.

TALENT SEARCH PROGRAMS

College Project Talent Search, Educational Talent Search, and University Access Talent Search

College Project, University Access and Educational Talent Search are early-intervention college preparatory projects. Serving more than 2,000 students in grades 6-12, the programs promote the skills and motivation necessary for successfully completing a baccalaureate degree. They prepare students to meet their college goals by emphasizing personal and career development, technological and academic skills, ACT readiness/payment, college preparatory workshops, financial aid, financial literacy, and support for completing a rigorous high school curriculum. Academic monitoring and guidance counseling are incorporated to facilitate student progress. Services are provided at participating schools on an outreach basis, and summer enrichment and campus-based events provide ongoing opportunities for institutional and faculty involvement. The Talent Search programs are under the federal umbrella of "TRIO" programs funded by the U.S. Department of Education. Eligibility requirements include but are not limited to having first-generation/low income status and exhibiting academic potential. For additional information, visit ts.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 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) and the Spoken Language Proficiency Test (SLPT). 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 1435 W. Walton or call 479-575-3948.

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 four branch libraries:

- The Robert A. and Vivian Young Law Library
- The Fine Arts Library
- The Chemistry and Biochemistry Library
- The Physics Library

The spacious Helen Robson Walton Reading Room is the Libraries' most popular quiet study area, and group study rooms are also available. More than 200 reference databases and thousands of electronic journals are accessible from anywhere with a University ID. Reference librarians assist users in locating and using library resources. Students may send questions by e-mail, telephone, or 24/7 chat, and can schedule a one-on-one session with a librarian for more extensive research questions. Reference librarians also conduct orientation sessions on research methods throughout the semester. Students may also visit the tutors from the Quality Writing Center and the Enhanced Learning Center on site in Mullins Library Sunday through Thursday. With more than 1.9 million volumes and 27,000 journal subscriptions, students will find plenty of research material for every subject. Other resources in the collections include several thousand maps, manuscripts, and more than 33,000 audio and visual materials, including music scores, recordings, and movies, that you can hear or view in the Performing Arts and Media Department.

A full-service computer University Commons is located on the lobby level of Mullins, and students may check out a laptop and log onto the Internet from anywhere in the library using wireless access. Visit the Libraries' Web page at <http://libinfo.uark.edu> to learn more about services and collections or access the My Library function that allows users to check library records, renew books, request holds and save catalog

searches. Items not owned by the University Libraries may be obtained through inter-library loan by completing the online registration and request forms. Requested items in electronic format will be sent directly to desktops, usually within 24 hours; physical items will be held for pickup at the main service desk on the Lobby Level.

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. The Government Documents Department has also been a depository for Arkansas state publications since 1993. The University Libraries' map collection and GIS (Geographic Information Systems) program, including a public GIS workstation equipped with ArcGIS Desktop Suite, are available.

In Special Collections, students can read rare books from around the world, consult the largest book collection related to Arkansas, handle historic letters and diaries, magazines, and old photographs related to Arkansas, as well as watch old black and white films made in or about the state. A number of digital collections can be accessed online through the Special Collections' website at <http://digitalcollections.uark.edu/>.

For information concerning collections and services, please inquire at 479-575-4104. For any other library matter, please contact the Dean's Office at 479-575-6702.

UPWARD BOUND PROGRAMS

Upward Bound, Upward Bound Academy for Math and Science, and Veterans Upward Bound

Upward Bound and Upward Bound Math and Science are early intervention programs that help low-income and potential first-generation college students prepare for higher education. These programs bring high school students in grades 9 – 12 to the University of Arkansas campus on weekends and during the summer to receive instruction in mathematics, laboratory sciences, composition, literature, and foreign languages. The programs also provide academic and social support through tutoring, counseling, mentoring, cultural enrichment, financial literacy, field trips, college planning, and financial aid assistance. For students just completing their senior year of high school, Upward Bound provides a summer residential bridge program that enables participants to earn up to six hours of college credit.

Veterans Upward Bound is designed to identify and serve the unique needs of veterans who have the academic potential and desire to enter and succeed in a program of higher education. Eligible veterans must have completed a minimum of 180 days of active duty in the military or Coast Guard and hold any discharge other than dishonorable. Services include tutoring; guidance counseling; assistance in filing financial aid and VA benefit forms; academic/career advisement; test preparation for entrance exams; and courses in English, Spanish, math, science, and computer technology. Courses are offered days and evenings each semester. Funding is provided through grants from the U.S. Department of Education.

University Centers and 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.

Graduate students are likely to be involved in research conducted by these research units, but the university encourages undergraduates as well to pursue research in their areas of academic interest. Students who wish to engage in research of any kind should seek the guidance of their advisers and professors to identify research teams and projects. In addition to the extensive work performed by faculty through individual and team efforts in academic departments, special programs of research are conducted by faculty members and staff in many associated University research centers. The University invites students to learn more about these centers and the research opportunities they offer by visiting the Web sites or by contacting the individuals listed below.

AGRICULTURAL EXPERIMENT STATION

<http://aaes.uark.edu/>

Richard A. Roeder, associate director

AFLS E108

479-575-2120

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 - academic affairs. The Associate Vice President - research also provides leadership for the agricultural experiment station and reports directly to the Vice President for agriculture for agricultural research programs. The Associate Vice President - academic programs reports primarily to the Provost/Vice Chancellor for Academic Affairs for instructional programs and also reports to the Vice President for agriculture.

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.

APPLIED SUSTAINABILITY CENTER

<http://asc.uark.edu/>

Jon Johnson, director

479-575-3556

The Applied Sustainability Center in the Sam M. Walton College of Business has a mission to coordinate research and education efforts across the campus with the aim of meeting current demands without compromising the needs of future generations. Some existing research areas are in agile agriculture, life cycle assessment, and reducing the carbon footprint of commercial products. Sustainability projects are undertaken in collaboration with a broad spectrum of businesses, governmental and not-for-profit organizations and academic partners.

ARKANSAS ARCHEOLOGICAL SURVEY

<http://www.uark.edu/campus-resources/archinfo/>

Thomas Green, director

ARAS 147

479-575-3556

archinfo@cavern.uark.edu

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 BIOTECHNOLOGY CENTER

The Arkansas Biotechnology Center is home for the University of Arkansas Herbarium. The center houses food safety research efforts of the Department of Food Science as well as the Agricultural Research Services Laboratories and Offices. The center also accommodates the curation laboratory and offices for the university collections. The coordinator of the Arkansas Biotechnology Center is Dr. James Rankin, Ozark Hall 118, 479-575-2470.

ARKANSAS CENTER FOR SPACE AND PLANETARY SCIENCES

<http://spacecenter.uark.edu/>
William Oliver, director
MUSE 202
479-575-7625
csaps@uark.edu

The Arkansas Center for Space and Planetary Sciences is a research institute of the University of Arkansas, created by faculty from six departments, including Biological Sciences, Chemical Engineering, Chemistry and Biochemistry, Electrical Engineering, Geosciences, Mechanical Engineering, and Physics. Those departments, representing the J. William Fulbright College of Arts and Sciences and the College of Engineering, work closely with the Graduate School and the Honors College.

The center operates world-class research facilities and cutting-edge research projects. It houses the only university-based, large-scale planetary simulation chamber in the country along with major facilities for the analysis of extraterrestrial samples. Major research interests include the analysis of returned samples from space, the nature of Mars, and instrumentation for use in space. The center also operates a number of programs of interest to the university community, grade school teachers and students, and the public.

The space center administers master's and doctoral degree programs in space and planetary science. These provide a unique integrative interdisciplinary education and research training based on a suite of core courses spread across the departments and specialist courses appropriate to the student's specific interests. Professional development in communications, ethics and space policy is also included. Such training gives graduates a competitive edge in today's space and planetary job market.

Additionally, the Departments of Biological Sciences, Geosciences and Physics offer space and planetary science as an option in their own graduate programs. Admission procedures are outlined on the space center Web site along with detailed information about the programs, the research areas, and current research projects.

ARKANSAS COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

<http://new-www3.uark.edu/biscweb/Coop/home/coophome.htm>
David Kremrentz, unit leader
SCEN 632
479-575-6709
coopunit@uark.edu

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 personnel are federal employees stationed on the University of Arkansas campus.

ARKANSAS HIGH PERFORMANCE COMPUTING CENTER

<http://hpc.uark.edu/>
Amy Apon, director
479-575-6794

The Arkansas High Performance Computing Center is a campuswide provider of supercomputing resources for research by students and faculty. The Star of Arkansas became operational in June 2008 with partial funding from the National Science Foundation. At that time, Star ranked 339 on the list of the world's 500 fastest supercomputers with a sustained performance of 10.75 teraflops (trillions of floating point operations per second). The Center supports a full breadth of research applications including computational condensed matter physics, computational chemistry, and nanoscale material behavior. The Center also provided educational experiences for students seeking experience in a parallel computing environment.

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.arkansasleadershipacademy.org/>
Debbie Davis, director
WAAX 300
479-575-3030

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 WATER RESOURCES CENTER

<http://www.uark.edu/depts/awrc/>
Brian E. Haggard, director
OZAR 112
479-575-4403
awrc@uark.edu

The Arkansas Water Resources Center, a unit of the Division of Agriculture, was established by Public Law in 1964. The Center utilizes scientific personnel and

facilities of all campuses of the University of Arkansas system (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://bmcee.uark.edu>

Rita Littrell, director

RCED 217

479-575-2855

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 University SIFE team is quickly becoming a nationally recognized organization.

CENTER FOR ADVANCED COMPUTING AND COMMUNICATIONS RESEARCH

The Center for Advanced Computing and Communications Research is housed in the College of 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 and cluster computing, DNA computing, agent-based computing, and low-power systems.

CENTER FOR ADVANCED SPATIAL TECHNOLOGIES

<http://cast.uark.edu/>

Jackson Cothren, director

OZAR 12

479-575-6159

info@cast.uark.edu

The Center for Advanced Spatial Technologies (CAST) focuses on application of geospatial technologies in research, teaching, and service. These technologies include geomatics, 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 and industrial 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 many corporations, including the Intergraph Corporation, Trimble Navigation Inc., the Oracle Corporation, Definiens Imaging, Sun Microsystems, Spatial Acquis, and PCI Geomatics. These and other corporate sponsors have provided more than \$22 million of in-kind support of the research teaching facilities of the center. The center has extensive hardware and software capabilities, including more than 100 high-performance workstations, multiple Linux, Windows XP and Solaris servers (combined seven terabyte of on-line disk), large-format plotters, mapping and survey-grade GPS, MSS instruments, spectroradiometers, terrestrial laser scanners, and an extensive inventory of software.

University of Arkansas undergraduate and graduate students have a wide range of geomatics 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/>

Robert Cochran, director

MAIN 506

479-575-7708

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/>

Kathy Deck, director

WJWH 545

479-575-4151

cberinfo@cavern.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.

CENTER FOR COMMUNICATION AND MEDIA RESEARCH

http://www.uark.edu/depts/comm/Center_for_Communication_and_Media_Research.html

Robert H. Wicks, director

KIMP 417

479-575-3046

rwicks@uark.edu

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

de communication and advertising, dispute resolution, education, environmental concerns, family, health, information technology, legal concerns, life stages, media audiences, organizational concerns, politics, and religion.

CENTER FOR CHILDREN AND YOUTH

<http://coehp.uark.edu/9740.php/>

Chris Goering, director

PEAH 305

479-575-4209

cgoering@uark.edu

The Center for Children and Youth is designed to address issues of intellectual growth, social development, literacy, the arts, and techniques for addressing generational or regional poverty issues. This will be accomplished through teacher professional development, pre-service education, research, as well as curriculum development and dissemination. The center was established by a generous gift of the Windgate Family Foundation in 2006 to the College of Education and Health Professions.

In 2010, the Center for Children and Youth hosted a national conference in Springdale, Ark., focused on the confluence of literacy and the arts. The conference featured speakers from the Kennedy Center for Performing Arts, Temple University, the National Council of Teachers of English, and local experts on arts integration approaches to teaching. Later in 2010, Dr. Chris Goering in the Curriculum and Instruction Department was appointed as the center's first director. E-mail Dr. Goering or call him at 479-575-4209.

CENTER FOR ENGINEERING LOGISTICS AND DISTRIBUTION

<http://celdi.ineg.uark.edu/>

Russell D. Meller, executive director

BELL 4207

479-575-2124

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.

CENTER FOR EXECUTIVE EDUCATION

<http://cmed.uark.edu/>

Therese Steifer, director

RCED 140

479-575-2856

cmed@walton.uark.edu

The Center for Executive Education 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 INFORMATION SECURITY AND RELIABILITY

<http://cmed.uark.edu/>

Brajendra Panda, director

JBHT 504

479-575-2067

bpanda@uark.edu

The center was established to promote education and research in the field of computer security and information assurance at University of Arkansas. The activities of this center includes, but not limited to the following: fostering multidisciplinary research, securing large-scale funding from federal, state, and other funding agencies, providing education and training to future work-force, increasing awareness in the field of information security and reliability by offering appropriate seminars and workshops.

CENTER FOR INNOVATION IN HEALTHCARE LOGISTICS

<http://cihl.uark.edu/>
 Ron Rardin, director
 479-575-6033

Founded in March 2007, the Center for Innovation in Healthcare Logistics in the College of Engineering seeks ways to adapt logistics and supply chain solutions from other industries to improve the delivery of health care. The goal is to recover significant costs and achieve new efficiencies, while enhancing safety, quality and equity of patient care.

CENTER FOR MATHEMATICS AND SCIENCE EDUCATION

<http://cmase.uark.edu>
 Lynne Hehr, director
 346 N. West Avenue, No. 102
 479-575-3875

The Center for Mathematics and Science Education (CMASE) – a University of Arkansas K-16 education outreach facility within the College of Education and Health Professions – 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 the Web site.

CENTER FOR PROTEIN STRUCTURE AND FUNCTION

<http://protein.uark.edu/>
 Frank Millett and Roger Koeppel, co-directors
 CHEM 119
 479-575-4601

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.

CENTER FOR RETAILING EXCELLENCE

<http://cre.uark.edu/>
 Claudia B. Mobley, director
 WJWH 538
 479-575-2643

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

<http://www.nhn.ou.edu/cspin>
 Greg Salamo, co-director
 PHYS 226
 479-575-5931

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- photonic 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 website.

CENTER FOR SOCIAL RESEARCH

William Schwab, director
 Main 211
 479-575-3206
 bschwab@uark.edu

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 STATISTICAL RESEARCH AND CONSULTING

Joon Jin Song, director
 SCEN 309B
 479-575-6319
 csrc@uark.edu

The Center for Statistical Research and Consulting will be a service and research unit of UA, administratively housed in Department of Mathematical Sciences, providing faculty and graduate students in the university with an environment for collaboration in research and instruction emphasizing statistical / quantitative approaches. It offers statistical consulting and statistical software support to faculty, staff, graduate and undergraduate students conducting research at UA. The center will extend this statistical support to the State of Arkansas, directly providing some consulting services but primarily acting as a conduit for industry, government, and non-profit organizations to engage campus faculty and graduate students in consulting opportunities. The community support activities from the center will stimulate and enhance campus research and instructional efforts as well as provide important services to organizations throughout the region.

The mission of the Center for Statistical Research and Consulting is to participate in research to provide high quality statistical input to high quality research projects, train statisticians to interact effectively with investigators from other disciplines, and encourage collaborative research between statisticians and investigators from other disciplines.

The center is a fee-for-service unit. The initial consulting meeting with a client is provided at no cost. All subsequent and follow-up visits will require financial support.

CENTER FOR THE UTILIZATION OF REHABILITATION RESOURCES FOR EDUCATION, NETWORKING, TRAINING AND SERVICES

<http://www.rcep6.org/>
 Jeanne Miller, director
 105 Reserve St., Building 35
 Hot Springs, AR 71902
 501-623-7700

Established in 1974, this center provides human resource and organization development services for a broad audience in the rehabilitation and disability communities. Projects managed by CURRENTS vary in scope from state and local to regional and national levels. The center is housed at the Hot Springs Rehabilitation Center, Hot Springs, Arkansas.

REHABILITATION RESEARCH AND TRAINING CENTER FOR PEOPLE WHO ARE DEAF OR HARD OF HEARING

<http://www.uark.edu/depts/rehabres/>
 Douglas Watson, project director
 26 Corporate Hill Drive
 Little Rock, AR 72205
 501-686-9691 (v/tty)

Established in 1981, this national center conducts research and training programs to enhance rehabilitation efforts on behalf of the 31 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 is currently conducting research focused on improving the nation's services for those individuals with functional limitations that necessitate intensive and longer-term education, rehabilitation and related services to enhance employment, independent living and community participation.

CENTER OF EXCELLENCE FOR POULTRY SCIENCE

<http://www.poultryscience.uark.edu/>
 Michael Kidd, director
 POSC 114
 479-575-3699

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.

CHEMICAL HAZARDS RESEARCH CENTER

<http://www.cheg.uark.edu/4444.php/>
 Jerry Havens, director
 BELL 3157
 479-575-3857
 jhavens@uark.edu

The Chemical Hazards Research Center determines the consequences of atmospheric release of potentially hazardous materials with a present emphasis on liquefied natural gas in transportation and storage operations. Computational models are used in conjunction with the wind tunnel at the center, which is presently the largest low-speed wind tunnel suited for such studies.

THE COMMUNITY AND FAMILY INSTITUTE

<http://sociology.uark.edu/3550.php>
 Kevin Fitzpatrick, director
 MAIN 211
 479-575-3777
 kfitzpa@uark.edu

The Community and Family 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.

DAVID AND BARBARA PRYOR CENTER FOR ARKANSAS ORAL AND VISUAL HISTORY

<http://libinfo.uark.edu/specialcollections/pryorcenter/>

Kris Katrosh, director
MULN 403
479-575-6829

The mission of the Pryor Center for Arkansas 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 Mullins Library, Room 403, 365 N. McLroy Ave., University of Arkansas, Fayetteville, AR 72701; to contact the center, call 479-575-6829, or visit the website.

DIANE D. BLAIR CENTER OF SOUTHERN POLITICS AND SOCIETY

<http://www.uark.edu/ua/tshield>

Todd Shields, director
MAIN 428
479-575-3356

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.uark.edu/ua/artp/facilities/enrc.html>

Mike Brosius, facility manager
700 Research Center Blvd.
479-575-7318
brosius@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.

FULBRIGHT INSTITUTE OF INTERNATIONAL RELATIONS

<http://www.uark.edu/~fiir/>

Donald R. Kelley, director
MAIN 428
479-575-2006

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.

GARRISON FINANCIAL INSTITUTE

<http://gfi.uark.edu>

Wayne Lee, executive director
RCED 205
479-575-4399

The Garrison Financial Institute is an institute organized within the Sam M. Walton College of Business to advance financial education and knowledge through practice. Its mission is to enhance student learning through experience, foster research that extends and perfects best practices, and contribute to the economic development of the State of Arkansas and the welfare of its citizens. The center was founded in 2005.

GARVAN WOODLAND GARDENS

<http://www.garvangardens.org/>

Bob Byers, Garden Director
550 Arkridge Road, PO Box 22240
Hot Springs National Park, AR 71913
1-800-366-4664
gardeninfo@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 Fay Jones 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, AR, 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. Numerous designed features offer case studies for landscape architecture and architecture students as well as professionals, including the Asiatic Garden by David Slawson, a nationally recognized Japanese garden designer, and the Verna C. Garvan Pavilion, by internationally recognized architects 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 sustainable golf course design.

Garvan Woodland Gardens is a member of the American Association of Botanical Gardens and Arboreta.

GENESIS TECHNOLOGY INCUBATOR

<http://www.uark.edu/ua/artp/>
 David Whitmire, director of finance
 700 Research Center Blvd.
 479-575-7446

Located at the Arkansas Research and Technology Park and 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.

HIGH DENSITY ELECTRONICS CENTER

<http://www.hiddec.uark.edu/>
 Simon Ang, director
 HiDEC/ENRC 700
 479-575-4627

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.

HiDEC also houses the Center of Excellence for Nano-, micro-, and Neuro-Electronics, Sensors and Systems (CENNESS).

HUMAN PERFORMANCE LABORATORY

<http://hpl.uark.edu>
 Ro DiBrezzo, director
 HPER 321
 479-575-6762

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/>
 Eric Bradford, managing director
 JPHT 409
 479-575-4261

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 FOR NANOSCIENCE AND ENGINEERING

<http://nano.uark.edu/>
 Gregory Salamo, director
 NANO 104
 479-575-4187

The Institute for Nanoscience and Engineering is based in the Nanoscale Material Science and Engineering Building, opened in 2011 with the state-of-the-art equipment and clean rooms necessary for building materials one atom at a time. The institute provides an interdisciplinary team of researchers in the fields of physics, engineering, chemistry and biology whose mission, in part, is to develop businesses in Arkansas based on nanoscience and engineering.

INSTITUTE OF FOOD SCIENCE AND ENGINEERING

<http://www.uark.edu/depts/ifse/>
 Jean-Francois Meullenet, director
 Food Science Building
 2650 N. Young Ave.
 Fayetteville, AR 72704
 479-575-4040

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.

INTERNATIONAL CENTER FOR THE STUDY OF EARLY ASIAN AND MIDDLE EASTERN MUSICS

<http://www.uark.edu/ua/eeam>

Rembrandt Wolpert, director

MUSC 201

479-575-4701

ceam@cavern.uark.edu

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 repertoires 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.

KING FAHD CENTER FOR MIDDLE EAST STUDIES

<http://mest.uark.edu/>

Joel Gordon, director

MAIN 202

479-575-4755

The King Fahd Center for Middle East 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.mackblackwell.org/>

Heather Nachtmann, director

BELL 4190

479-575-5857

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/>

Harrison Pittman, director

WATR 107

479-575-7646

nataglaw@uark.edu

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 website.

NATIONAL CENTER FOR RELIABLE ELECTRIC POWER TRANSMISSION

<http://ncrept.eleg.uark.edu/>
 Alan Mantooh, executive director
 2055 South Innovation Way
 479-575-4838

The National Center for Reliable Electric Power Transmission (NCREPT) in the College of Engineering is located in a new building at the Arkansas Research and Technology Park. The Center seeks to research and develop prototypes of advanced power electronics systems for applications in the power grid, including both protection and storage devices.

The Center also serves as a test facility for advanced power electronic circuit and package designs for distribution-level voltages and high currents. The Center is a unique educational resource for students interested in working in the power utility and power electronics sectors.

NATIONAL OFFICE OF RESEARCH, MEASUREMENT, AND EVALUATION SYSTEMS

<http://normes.uark.edu>
 Sean Mulvenon, director
 WAAX 302
 479-575-5593
orme@cavern.uark.edu

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 Curriculum and Instruction. 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://nwawp.org/>
 Chris Goering, director

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 96 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, and postgraduates, as well as 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 specifically 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 in the ORISE Catalog of Education and Training Programs, which is available 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 the Vice Provost for Research and Economic Development, and ORAU Councilor for the University of Arkansas; or Monnie E. Champion, ORAU Corporate Secretary, 865-576-3306; or visit the ORAU website. (<http://www.orau.org>).

OFFICE FOR EDUCATION POLICY

<http://www.uark.edu/ua/oep/>
 Gary Ritter, director
 GRAD 201
 479-575-3773
oep@uark.edu

The Office for Education Policy was established in the College of Education and Health Professions in 2003 and is currently housed in the Department of Education Reform. The office serves as an objective, third-party source of data, gathering and disseminating evidence that would aid lawmakers and policymakers in making thoughtful decisions regarding education in the state of Arkansas. The primary objective of the Office for Education Policy is to collect and analyze data relevant to educational policy issues and disseminate the findings to policymakers in a timely and accessible manner. The office addresses questions of specific interest to Arkansas education policymakers in regularly published policy briefs, fact sheets and its newsletter, Education Policy News.

The Office for Education Policy also responds to specific requests of lawmakers and anticipates and addresses potential areas of interest to lawmakers. Finally, the office examines and follows national trends in education and shares the information with Arkansas policymakers.

OFFICE FOR STUDIES ON AGING

<http://www.uark.edu/misc/aging/>

Ro DiBrezzo and Barbara Shadden, co-directors

HPER 321X

479-575-5262

aging@uark.edu

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.

RADIO FREQUENCY IDENTIFICATION RESEARCH CENTER

<http://itri.uark.edu/rfid.asp>

Justin Patton, managing director

2700 S. Armstrong

Dock Door 28

Fayetteville, AR 72701

479-236-5890

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 AND TECHNOLOGY DEVELOPMENT CENTER

<http://sbtcdc.uark.edu/>

Larry Brian, director

RCED 210

479-575-5148

The Small Business and Technology Development Center (SBTDC), located in the Walton College of Business, provides small business consulting and technical assistance to the business community of Northwest Arkansas. The SBTDC 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 SBTDC 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 SBTDC resource center.

SOUTHWEST RADIATION CALIBRATION CENTER

Dwight Salisbury, manager

479-575-6309

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://cdis.uark.edu/spcl.php>

Barbara Shadden, director

606 N Razorback Road

479-575-4509

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/>

Jim Crowell, director

WJWH 538

479-575-6107

The Supply Chain Management Research Center (SCMRC) at the 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 University (e.g., The Logistics Institute in the 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 AFB 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 479-575-7334 or fax 479-575-4173.

TERRORISM RESEARCH CENTER

<http://trc.uark.edu/>

Brent L. Smith, director

MAIN 228

479-575-3401

bls@uark.edu

The Terrorism Research Center in the J. William Fulbright College of Arts and Sciences houses the American Terrorism Study, the nation's only comprehensive longitudinal database on American terrorism. Conducted in cooperation with the Federal Bureau of Investigation and sponsored by the U.S. Senate Judiciary Committee, the American Terrorism Study provides a record of federal terrorism cases resulting from indictment under an FBI "terrorism enterprise" investigation from 1980 to the present. The center is also engaged in several projects examining the spatial and temporal dimensions of terrorism, precursor and preparatory terrorist crimes, and prosecutorial and defense strategies in terrorism trials. The center's research is funded by the Department of Homeland Security through the Memorial Institute for the Prevention of Terrorism and the Department of Justice through the National Institute of Justice.

TYSON CENTER FOR FAITH AND SPIRITUALITY IN THE WORKPLACE

<http://trc.uark.edu/>

Judith Neal, director

WJWH 518

479-575-3721

jan002@uark.edu

The center's vision is to be recognized as an international center networked with other international centers, where students, academics, practitioners, business leaders and faith leaders come together to understand the effects of faith and spirituality in the workplace and develop methodologies to help transform organizations in a way that

has a positive impact on the world. The center teaches courses on faith and spirituality in the workplace, provides resources to businesses and community, and maintains a database of relevant research, including conducting its own case studies.

The Tyson Center for Faith and Spirituality in the Workplace was established by a grant from Tyson Foods Inc. and the Tyson Family Foundation in 2009.

UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER

<http://uacdc.uark.edu/>

Stephen Luoni, director

104 N. East Ave.

Fayetteville, AR 72701

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 Fay Jones 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 design center also offers hands-on civic design experience to students who work under the direction of design professionals. UACDC was founded in 1995 and has provided design and planning services to more than 30 communities across Arkansas. UACDC planning has helped Arkansas communities and organizations to secure nearly \$62 million in grant funding to enact suggested improvements.

Student Affairs

VISION STATEMENT

The University of Arkansas Division of Student Affairs engages students to develop their strengths, inspiring leadership for a global society.

Mission Statement

The University of Arkansas Division of Student Affairs strengthens students for success.

Values

The University of Arkansas Division of Student Affairs values inclusion, service, inquiry, partnership, and excellence:

Inclusion: We embrace the uniqueness of individuals and engage every member of our diverse community.

Service: We connect students to resources, opportunities, and experiences transforming them into active, engaged citizens of a global society.

Inquiry: We engage ourselves and our students in the acquisition, application, and creation of knowledge for lifelong learning.

Partnership: We explore and welcome opportunities to collaborate with our students, colleagues, and members of our global community.

Excellence: We apply our varied talents and strengths with integrity to providing exceptional service to our students.

Strategic Goals

To achieve this Mission the University of Arkansas Division of Student Affairs will:

- Foster the ongoing development of an inclusive community.
- Enhance students learning through effective programs and services.
- Advocate rights and responsibilities through service to students and collaboration with partners.
- Steward all of the Division's resources responsibly.
- Communicate and collaborate effectively.

The Vice Provost for Student Affairs/Dean of Students administers the departments of the Division of Student Affairs and provides leadership in the development of programs and services that supplement the classroom experience of students and enrich the quality of campus life. The Vice Provost/Dean of Students serves as a liaison to other administrative offices, faculty, and student governing groups. The office is a central source of information concerning University policies and procedures affecting student life and co-curricular programs and services.

The Division of Student Affairs and the office of the Vice Provost/Dean of Students emphasizes student advocacy while broadening the development of services and programs that address a range of student and campus needs. Departments in the Division are dedicated to developing exceptional programs and services that enhance the University of Arkansas Experience and enrich the quality of student and campus life. Staff members are available and willing to assist with any problem or question a student, staff, or faculty member may have regarding student and campus life at the University of Arkansas. The office is available for the clarification of University policies and procedures, confidential consultation, formal academic grievances, personal and

family crisis assistance for students, and referral to all campus and community services. The office also seeks to assist students and faculty members in cases of emergency or extenuating circumstances. Staff members are firmly committed to addressing the challenges and individual needs of the University of Arkansas family.

The Division of Student Affairs is committed to strengthening students for success. In this effort, the Division is developing a two-tier model of student development and staff development. StrengthsQuest is a trademarked online assessment tool that helps individuals discover, define, and develop their talents into strengths to achieve success. The Division of Student Affairs at the University of Arkansas is committed to providing opportunities for university members to discover, develop and apply their talents and strengths for personal and professional success. Ultimately, success is defined by each student and staff member and comes as a result of understanding their unique talents, developing knowledge related to those talents, engaging in experiences to expand on those talents, and ultimately leveraging those talents to become strengths which lead to success.

STUDENT LIFE

Off Campus Connections

Off Campus Connections provides friendly and helpful resources and referrals for off-campus undergraduates, which includes:

- First-year students living at home
- Upperclassmen living off campus
- Adult, returning, and transfer students

Off-campus students are defined as undergraduates not living in a residence hall, fraternity, or sorority house. Approximately 15,000 University of Arkansas undergraduate students live off-campus. This group of students is extremely broad, ranging from teenagers to senior citizens. There are traditional-aged students, as well as nontraditional student and adult learners who meet one or more of the following criteria: age 24-plus, married, with dependents, work full-time, part-time student, financially independent, non-traditional high school diploma, interrupted higher education. Some off-campus students live close to the university and some commute from hours away. Some participate in alternative delivery or online classes, so they may seldom visit campus at all.

Off Campus Connections assists in student retention efforts by providing information, referrals, support, and recognition to students who are living off campus. Peer Assistance Leader Students (PALS) are trained to assist their fellow students. PALS can provide helpful information and answer many questions, so students should not hesitate to take advantage of their knowledge.

Finding a place to live is a basic need. To facilitate the housing search, <http://offcampushousing.uark.edu> is a searchable website provided free of charge for current and prospective students. The area properties listed on the website are interested and normally experienced in having student tenants. A very popular Off-Campus/Commuter Meal Plan is available to students through Chartwells Campus Dining Service.

Campus involvement is important, especially for off-campus students. Students who are involved or work on campus are more likely to graduate. To encourage student involvement, timely information about deadlines, campus life and other pertinent events are shared through weekly e-mail announcements. A friendly and comfortable

Commuter Lounge is located on the Sixth Floor West of the Arkansas Union. Off Campus Connections' desire is for each student to feel a part of the university and earn a degree from the University of Arkansas.

For further information, visit the Off Campus Connections Web site at <http://occ.uark.edu/> or send an e-mail to occ@uark.edu. Students may also visit the office in Arkansas Union Room 632 or contact the OCC by telephone at 479-575-7351. In order to provide better customer service, appointments are appreciated and may be made in advance from the OCC website.

Veteran Resource and Information Center

The University of Arkansas Veterans Resource and Information Center ensures the academic and professional success of student veterans by understanding their unique needs and by serving as a central point of contact into a seamless collaboration between prospective and current student veterans, the University of Arkansas, the U.S. Department of Veterans Affairs, and a diverse network of community partners.

Veterans and dependents of service members may be eligible to receive monthly educational assistance from the Veterans Administration while enrolled at the University of Arkansas. For more information, including GI Bill eligibility, contact the Veterans Resource and Information Center at vrvc@uark.edu or 479-575-8742. Students may also visit the center in Arkansas Union Room 632 or online at <http://veteranscenter.uark.edu/>.

Reasonable Accommodations for Students with Disabilities

The Center for Educational Access (CEA), 104 Arkansas Union, is the central campus resource for students who require reasonable accommodations in order to access the programs, services and activities offered through the University. CEA staff work in partnership with the individual student to communicate and facilitate any accommodation needs to faculty and staff. Accommodation determination is based on an analysis of medical or psychological documentation provided to the CEA by the student. Students must meet with one of the CEA staff to discuss their needs and provide such documentation before any accommodations can be granted.

To register for services or for more information, contact the Center for Educational Access, University of Arkansas, 104 ARKU, Fayetteville, AR 72701, phone 479-575-3104 (voice) or 479-575-3646 (TTY); e-mail: ada@uark.edu; Web: <http://www.uark.edu/us/csd/>.

Office of Academic Integrity and Student Conduct

The mission of the Office of Academic Integrity and Student Conduct (OAISC) is to provide an equitable and effective educational system that promotes responsibility, individual growth, accountability, and student learning through community outreach, peer mentoring, and enforcement of the Code of Student Life. The Office of Academic Integrity and Student Conduct is designed to provide an equitable process for addressing alleged infractions of University policies, regulations, and/or laws by students. This system is informal, non-adversarial, and intended to be a part of the overall educational process. Students are encouraged to make responsible decisions and to be accountable for their actions. In addition, students who witness violations of the Code of Student Life or the Academic Integrity policy or who are victims of inappropriate or illegal behavior perpetrated by other students are encouraged to report such activity to the Office of Academic Integrity and Student Conduct.

Students who are interested in involvement with the All-University Conduct Board or the All-University Academic Integrity Board should contact the director of OAISC at judicial@uark.edu or honesty@uark.edu. The All-University Conduct Board comprises faculty, staff, and students and is responsible for the adjudication of cases of alleged student misconduct as outlined in the Code of Student Life. The All-University Academic Integrity Board comprises faculty and students and is responsible for the adjudication of cases of alleged violations of the Academic Integrity policy. Both of these boards are advanced leadership opportunities for students who would like to gain valuable experience working with faculty and staff on an impartial peer review board.

For more information regarding the Code of Student Life, please see the Student Handbook at <http://handbook.uark.edu>. For more information regarding the Academic Integrity policies, please review the Provost's website at <http://provost.uark.edu/>. The Office of Academic Integrity and Student Conduct is located in the Arkan-

sas Union Room 634, phone 479-575-5170; Web: <http://ethics.uark.edu/>.

UNIVERSITY CAREER DEVELOPMENT CENTER

The University Career Development Center helps students achieve great job search results. Students can take advantage of the center's valuable resources:

Career Advising: Advisers in the CDC are available to assist students who may need help selecting a college major, looking for career information, researching or exploring careers, preparing for their job search or considering a graduate school.

Career and Strength-Awareness Assessments: The STRONG Interest Assessment, FOCUS 2 and TypeFocus are career assessments that can help students make career decisions based on their interests and values. StrengthsQuest is an assessment which helps individuals discover their talents and strengths. After discovering talents, the Career Center assists students in learning how to use their talents to achieve academic, career, and personal success.

Career Fairs: In partnership with academic areas on campus, the CDC hosts a number of career fairs is offered each year to provide opportunities for students to connect with employers and to learn more about companies and organizations. These connections could lead to valuable internships or full-time employment.

Job Search Preparation: The CDC offers resume critiques, interview skills training, mock interview, networking opportunities, and several professional development events throughout the academic year to prepare students for internships, co-ops or full-time jobs.

Cooperative Education Opportunities: Cooperative Education is a program that enables students to gain professional work experience in paid, degree-related positions. Co-op students earn credit, a competitive wage and valuable "real world" work experience.

Internet Job Search Resources: Through the CDC's website, students are able to access a number of job search sites. These resources enable University of Arkansas students to apply for jobs online and to sign up for on-campus interviews.

Professional Development Institute: This nationally recognized program creates opportunities for UA students to develop professional career-building skills. Participation in this program can help students gain the valuable skills which give them the competitive advantage in their job or graduate school search.

For more information, check out career.uark.edu.

The University Career Development Center is conveniently located in Arkansas Union Room 607, or call 479-575-2805.

UNIVERSITY HEALTH CENTER

Pat Walker Health Center

The Pat Walker Health Center, an AAAHC accredited medical institution, provides professional and comprehensive medical care, mental health care, health education, and health promotion for the University of Arkansas community including students, faculty, and staff. Committed to physical, mental, spiritual, emotional, and social health, the highest standards of quality, and an appreciation of the value of each individual, the Pat Walker Health Center's services and programs support the education and development of each individual.

The current facility opened in November 2004 with expanded services for the University of Arkansas community. Students pay a small fee to help cover the cost of the new building and a per credit hour semester health fee that covers professional office visits. Student spouses are eligible for services and may elect to pay the health fee. Services other than professional office visits are the responsibility of the patient and/or their health insurance plan. The University strongly recommends that all students maintain health insurance. A student health insurance policy is available to all students, student spouses, and their dependent children. Students may enroll in this plan at the Pat Walker Health Center.

The Pat Walker Health Center is conveniently located at 525 North Garland and welcomes inquiries about specific services at 479-575-4451; TTY 479-575-4124. More information is available on the center's Web site at <http://health.uark.edu>.

Pat Walker Health Center services include:

Medical Services

Professional medical staff, including physicians, nurse practitioners and registered nurses, provide primary health care as well as women's health care. An allergy clinic and a travel immunization clinic are also available in addition to the services with a psychiatrist, orthopedist and a dietician. The Pat Walker Health Center is particularly advantageous to the campus community with a comprehensive clinical laboratory and X-ray facilities.

Counseling and Psychological Services

Counseling and Psychological Services (CAPS) provides a wide range of consultations to students, students' partners, staff, and faculty of the University of Arkansas. Psychologists, social workers, a psychiatrist, and professional counselors work with students to solve problems, understand themselves, grow personally, and develop more satisfying relationships with friends and family. In addition to office consultations and therapy sessions, students have opportunities to participate in educational programs on campus as well as access to 24-hour services for mental health crises. To access daily walk-in services or 24-hour emergency services, call 479-575-5276.

Health Promotion and Education

A unique feature of the Pat Walker Health Center is the complete focus on the promotion of good health and prevention of negative health conditions. Professional health educators serve the campus community with wellness and prevention activities delivered in a variety of educational settings including individual consultations, group presentations, awareness events, outreach activities, one-hour credit classes, and a variety of other educational programs. Students benefit from the breadth of health and lifestyle topics addressed, which help them attain success in all aspects of their lives.

UNIVERSITY HOUSING

University Housing is committed to providing a quality living and learning environment that both challenges and supports the personal, social, and academic development of our residents and their diverse communities.

National research has shown that academic success in the first year and beyond is directly linked to residing in an on-campus residence environment. The University of Arkansas recognizes the benefits that students receive from living on campus their first year. Therefore, all single students who are admitted to the University with a freshmen classification and under 21 years of age are required to live on campus in a residence hall, or in their parent or legal guardian's permanent home. Students who are admitted to the University of Arkansas as transfer students from another post-secondary institution, and who have completed at least 24 credit hours at that institution are not required to live on campus.

Requests for a newly admitted freshmen to live somewhere other than with parents or a legal guardian in their permanent home are not likely to be approved under most circumstances. Students planning to live with their parents or legal guardian in their permanent home should complete the Living with Parent Notification Form prior to attending an orientation session. Students requesting an exemption from the University of Arkansas Freshmen Residency Requirement should send all required paperwork to University Housing at least three weeks prior to attending an orientation session to ensure the student receives approval or denial prior to attending orientation. Failure to do so could cause long delays in the orientation process. Students needing a Living with Parent Notification Form or who wish to apply for an exemption to the University's requirement for single freshmen to live on campus may refer to the information on the Housing Web site: <http://housing.uark.edu/forms2/>.

Residence Halls are managed by a full-time Coordinator for Residence Education who has completed a master's degree program in higher education, counseling or a related degree. This individual is selected for his or her academic credentials and interest in helping others as well as his or her ability to work well with college students. In addition, every area or floor is staffed by a Resident Assistant who is an upperclass student with training, experience, and knowledge to answer students' questions and, more importantly, to help students find their own answers. Counselors in Residence (graduate assistants) provide short-term counseling for students living in the residence halls in response to personal, social, academic, and developmental needs.

University Housing offers innovative Living/Learning Communities for Univer-

sity of Arkansas students. These Living/Learning Communities comprise major- or discipline-specific Academic Learning Teams as well as more general and exploratory Thematic Learning Communities. These opportunities have been designed to help students in their transition to college, to fit their interests and needs, and to help them achieve success academically and socially. Most importantly, students get to live with peers who have similar interests, majors, or career plans. Members of Living/Learning Communities have the chance to get to know faculty on a personal level and develop strong friendships with fellow students. Living/Learning Communities cost nothing extra, and residents have the opportunity to participate in fun experiences that connect learning in and out of the classroom.

Living options include traditional halls, suites and apartments with designations of single-gender or co-ed. Rooms are available for visually or hearing-impaired students as well as those who are physically challenged. Residence hall entry/exit doors are secured and/or monitored 24 hours a day. Some entries are unlocked to accommodate offices housed in our facilities and classes that are held in our classrooms. Most, but not all, of these areas have interior doors that secure the living floors. Residents are provided access via an electronic access system. Students should be careful not to allow non-residents to follow them into their residence hall. Residents are provided access via a fob issued when they check-in. Students are responsible for escorting all visitors and guests at all times.

Each of the three separate dining facilities on campus is managed by Campus Dining Services and provides a natural setting for socializing with friends and enjoying a wide variety of high quality, nutritious meals. All students living in a residence hall, except those residing in summer school housing, are required to have a meal plan. There are several meal plans available to meet the needs of both on-campus and off-campus students. Learn more about Campus Dining Services online at <http://dineoncampus.com/razorbacks>.

ARKANSAS UNION

The Arkansas Union seeks to support unique and diverse programs, provide professional services, and satisfy the ever-changing needs of students, faculty, staff, alumni, and guests.

Tenets

Staff and students involved with the Arkansas Union pursue the following positions with regard to:

- **Facilities** – Offer a welcoming and inviting facility that provides a functional and exciting “Wooo Pig Sooie” atmosphere for all Union constituents
- **Services** – Promote student admission and retention by offering services, conveniences and amenities, while also serving the larger University of Arkansas community
- **Program Support** – Support departments and organizations in promoting the growth and development of students through civic, cultural, educational, social, and recreational programs

The Arkansas Union serves as the community center of the University for all members of the college family. As the “living room” of campus, the Union is the gathering place of the college. The Union provides services and conveniences that members of the campus community need in their daily lives and creates an environment for getting to know and understanding others through formal and informal associations. Located inside the Union are:

Retail Outlets

ATM's (various banks)	Razorback Shop
Catering and Dining Services	RZ's Coffeehouse*
Club Red Convenience Store	U.S. Post Office
First Security Bank	Union Hair Care
PMC - Drop-Off Copy Center	

Union Market

The Wok	El Grande Rojo Taqueria
Burger King®	Chick-Fil-A® Express
Sub Generation sandwiches	Mama Leone's Pizza & Pasta
The Diner	Au Bon Pain Soups & Garden Emporium Salads

Facilities

24-hour computer lab	Meeting rooms
Anne Kittrell Art Gallery	Reception rooms
Ballroom	Union Information Center
Banquet rooms	Union Theatre
Lounges	Union Programs Theater
Student Technology Center	University Recreation Fitness Center

The Arkansas Union is the center of student activity and is a perfect place for students to get involved on campus. The Union is a student-centered organization that values participatory decision-making. Through volunteerism, committees, and student employment, the Union offers first-hand experience in citizenship and educates students in leadership, social responsibility, and values. As the center of the college community life, the Union complements the academic experience through an extensive variety of cultural, educational, social, and recreational programs. These programs offer the opportunity to balance course work and free time as cooperative factors in education. The Union supports these departments and programs by hosting these events. In addition, housed within the Union are 14 offices dedicated to providing programs and services to students.

Student Services

- Arkansas Union Administration/Reservation Services
- Associated Student Government
- Campus Card Office
- Career Development Center
- Center for Community Engagement
- Center for Educational Access
- Greek Life
- Multicultural Center
- New Student and Family Programs
- Off Campus Connections
- Office of Academic Integrity and Student Conduct
- Student Activities
- Student Ombuds Office
- Treasurer's Office and Student Accounts
- University Productions
- Veterans Resource and Information Center

CAMPUS LIFE

Center for Community Engagement

The purpose of the Center for Community Engagement (CCE) is to promote civic engagement and leadership by connecting University of Arkansas students, faculty and staff with nonprofit organizations in the Northwest Arkansas area and beyond.

In order to serve this purpose, the CCE maintains volunteer.uark.edu which enables volunteers to search for agencies and service projects. It allows users to log service hours and earn opportunities for community recognition, such as the Presidential Service Award. Northwest Arkansas agencies and University of Arkansas registered student organizations also utilize the site to post service opportunities and recruit volunteers. Over 170 organizations are registered on the site, such as Habitat for Humanity, the U of A Friday Night Live program and Potter's House Thrift.

Volunteer Action Center

The Center for Community Engagement also houses the Volunteer Action Center, a student led volunteer coordination board with 30 members who are dedicated to active service in the community. Each year the VAC provides meaningful service opportunities through events and ongoing projects that engage the university and NWA communities. VAC sponsors programs and events including the Full Circle Food Pantry, Make a Difference Day, and the MLK Day of Service. Full Circle Campus Food Pantry is the newest program of the Volunteer Action Center Board; the pantry

serves students, staff and their families. Requests and more information can be found at <http://fullcircle.uark.edu>.

Get involved in the following ways:

- Drop by the Center for Community Engagement, Arkansas Union, Room A643, and chat with the office's great staff and students.
- Look for service opportunities on volunteer.uark.edu and log your hours. Just one hour makes you a VAC volunteer.
- Participate in events hosted by VAC and CCE throughout the year.
- Become a Volunteer Action Center board member. Applications are accepted annually.

Greek Life

The Office of Greek Life facilitates the educational process and provides resources related to programs that strengthen the growth and development of students affiliated with fraternities and sororities on campus. The overall mission is to strengthen the academic, cultural, moral, and social development of students in Greek organizations; provide training in strengths-based leadership and other personal and social skills; promote involvement in extracurricular activities and community service projects; and promote Greek Life as a productive and viable lifestyle on campus. The Office of Greek Life coordinates programs such as Recruitment, Greek Getaway, Greek Life Facilitators, and Greek Summit in collaboration with the Interfraternity Council, the National Pan-Hellenic Council, and the Panhellenic Council.

The Interfraternity Council (IFC), National Pan-Hellenic Council (NPHC), Panhellenic Council (PHC) and Multicultural Greek Council govern 12 national sororities and 17 fraternities. The officers and representatives of each council work with the Office of Greek Life to provide positive programs and strengths-based leadership opportunities to the members of the Greek organizations. The Greek Life office is in the Arkansas Union A687; phone 479-575-5001 or fax 479-575-3531; Web: uagreeks.uark.edu.

New Student & Family Programs

New Student & Family Programs at the University of Arkansas is a collaborative effort developed to enhance the academic and social integration of incoming students through a variety of classroom and co-curricular activities. The department supports and collaborates on many initiatives including: R.O.C.K. Camp; R.O.C.K. Camp Adventure; Hog W.I.L.L.D. (Welcome, Involvement, Leadership and Diversity) Welcome Weeks; New Student Assembly & Burger Bash; Help-A-Hog; Friday Night Live; Fall Family Weekend and Spring Family Reunion; Leadership Programs including Emerging Leaders and the UA Student Leadership & Career Academy; Parent and Family Programs; and the Parent Partnership Association. By providing transitional support for incoming students, their parents, and family members, our programs effectively promote the students' academic growth and support the mission of the University.

New Student & Family Programs is located in the Arkansas Union, Room A688; phone 479-575-5002; Web: <http://fye.uark.edu/>.

Student Activities

With a students-first philosophy, the Office of Student Activities provides an environment for involvement, empowerment, and collaboration through student organizations, programmatic experiences, and shared governance. The office maximizes the UA experience by advocating for all students, promoting intercultural understanding, and developing citizens who are prepared to positively impact their communities.

The Office of Student Activities, located in the Arkansas Union A665, is the central location for student organizations and activities for the University. The Office of Student Activities is responsible for the oversight and administration of the following areas:

Student Organizations

All student organizations must register annually with the Office of Student Activities. The Office of Student Activities provides student organizations with assistance and services to help them succeed, including the annual Student Involvement Fair known as Razorbash, information on facility reservations and fund-raising, trademark forms, mailboxes, and locker space. The office also assists student organizations in event planning, provides educational workshops for students and advisors, and con-

ducts retreats for student organizations. A limited number of offices are also awarded annually in the Arkansas Union to organizations.

Types of Registered Student Organizations (RSOs):

Governing – An organization whose primary purpose is to serve as a governing body for a large or specific constituency of students.

Greek – An organization with Greek letters who is a member of the National Inter-Fraternity Council, the Pan-Hellenic Council, or the National Pan-Hellenic Council.

Honorary/Service – An organization that requires a minimum grade point average as a prerequisite to membership and/or is affiliated with a national service or honorary organization.

International/Cultural – An organization whose primary purpose is to provide a forum in which participants create awareness for a specific culture through educational, social, and recreational activities.

Professional – An organization whose primary purpose is to provide a forum for participants to discuss and develop professional careers and/or is affiliated with a national or regional association.

Religious – An organization whose primary purpose is to provide information and activities associated with one or more religions.

Special Interest – An organization whose primary purpose is to provide an organized format for the practice and/or pursuit of a special or common interest.

Associated Student Government

The Associated Student Government (ASG) provides important services to the University community and is an integral part of the shared campus governance system. Associated Student Government is a student-led organization that enables students to have an active voice in the decisions and policy that directly affect all students at the University of Arkansas. Students involved in Associated Student Government have the opportunity to positively impact the quality of student life, work with and allocate student fees, provide a voice for student concerns as well as oversee programs and policies for all students. Through the executive, legislative and judicial branches of student government, students have the opportunity to work for and among their peers to make a difference on all levels of the University. Involvement levels and time commitment vary upon duties. Visit the student government website at <http://asg.uark.edu> or the Associated Student Government office (ARKU A669) to find out more.

University Programs

University Programs is a volunteer student organization responsible for planning and coordinating more than 150 events annually for the campus community. University Programs provides students with cultural and educational experiences, entertainment, and fun. Seven committees, all made up of students, select, schedule and produce events such as concerts, movies, lectures, fine arts performances, gallery exhibitions, and daytime programs. Being a part of University Programs gives the student committee members leadership training and real opportunities to gain practical planning experience. Supported by a student activity fee, University Programs events are free to students.

For further information, visit our website at <http://osa.uark.edu/>.

Student Media

The Office of Student Media administers and advises the official student media outlets of the University. These outlets are: the student newspaper, *The Arkansas Traveler*; the University of Arkansas yearbook, *The Razorback*; the student television station, UATV; and the student radio station, KXUA. All provide a forum for student expression, entertainment, news and information of interest to the campus community. Other than a small support staff, these groups are entirely staffed by student employees and volunteers, including editors and station managers. For more information, contact Student Media at 479-575-3406.

The Graduate Faculty

- Ackerson, Michael D.**, Ph.D. (University of Arkansas), Associate Professor, Chemical Engineering
- Adams, Charles H.**, Ph.D. (University of Virginia), Professor, English
- Adams, Douglas J.**, Ph.D. (University of Arizona), Associate Professor, Sociology and Criminal Justice
- Adams, Paul**, Ph.D. (Case Western Reserve University), Associate Professor, Chemistry and Biochemistry
- Adler, Jacob**, Ph.D. (Harvard University), Associate Professor, Philosophy
- Adler, Louis S.**, Ph.D. (Purdue University), Visiting Assistant Professor, Operations Management
- Agan, Joseph P.**, Ph.D. (University of Arkansas), Clinical Assistant Professor, Rehabilitation, Human Resources and Communication Disorders
- Agana, Carol E.**, M.S.N.Sc. (University of Arkansas at Little Rock), Instructor, Nursing
- Ahrendsen, Bruce L.**, Ph.D. (North Carolina State University), Professor, Agricultural Economics and Agribusiness
- Aji, Helene M.**, Doctor at Large (Universite de Paris-Sorbonne nouvelle), Adjunct Professor, History
- Akeroyd, John R.**, Ph.D. (Indiana University), Professor, Mathematical Sciences
- Akin, D. Scott**, Ph.D. (Mississippi State University), Assistant Professor, Entomology
- Allen, Myria W.**, Ph.D. (University of Kentucky), Professor, Communication
- Allison, Neil T.**, Ph.D. (University of Florida), Associate Professor, Chemistry and Biochemistry
- Aloysius, John A.**, Ph.D. (Temple University), Associate Professor, Supply Chain Management
- Altom, Carol A.**, M.B.A. (San Diego State University), Instructor, Operations Management
- Alverson, Andrew J.**, Ph.D. (University of Texas), Assistant Professor, Biological Sciences
- Amason, Patricia**, Ph.D. (Purdue University), Associate Professor, Communication
- Amerine, Jeffrey L.**, M.S. (University of Arkansas), Instructor, Management
- Anand, Vikas**, Ph.D. (Arizona State University), Associate Professor, Management
- Anders, Merle M.**, Ph.D. (University of Hawaii-Manoa), Assistant Professor, Crop, Soil, and Environmental Science
- Andersen, Craig R.**, Ph.D. (University of Minnesota), Associate Professor, Horticulture
- Anderson, Mary Pat**, M.S.W. (University of Kansas), Instructor, Social Work
- Andre, Michael G.**, Ph.D. (University of Michigan), Visiting Assistant Professor, World Languages, Literatures and Cultures
- Andrews, David L.**, Ph.D. (Syracuse University), Professor, Computer Science and Computer Engineering
- Ang, Simon S.**, Ph.D. (Southern Methodist University), Professor, Electrical Engineering
- Anthony, Nicholas B.**, Ph.D. (Virginia Polytechnic Institute and State University), Professor, Poultry Science
- Antov, Nikolay**, Ph.D. (University of Chicago), Assistant Professor, History
- Apple, Jason K.**, Ph.D. (Kansas State University), Professor, Animal Science
- Apple, Laurie M.**, Ph.D. (Oklahoma State University), Associate Professor, Human Environmental Sciences
- Aquilano, Mark T.**, Ph.D. (University of Arizona), Visiting Assistant Professor, World Languages, Literatures and Cultures
- Arenberg, Nancy M.**, Ph.D. (University of Arizona), Associate Professor, World Languages, Literature and Cultures
- Arentz, Jason**, Ph.D. (George Mason University), Instructor, Economics
- Arnold, Mark E.**, Ph.D. (Northern Illinois University), Associate Professor, Mathematical Sciences
- Arnold, Morris S.**, S.J.D. (Harvard Law School), Adjunct Professor, History
- Arrington, Andrea L.**, Ph.D. (Emory University), Assistant Professor, History
- Ashton, Dub**, Ph.D. (University of Georgia), Associate Professor, Marketing
- Askins, Robert A.**, Ph.D. (University of Minnesota), Visiting Professor, Biological Sciences
- Aslin, Larry W.**, M.A., (University of Missouri-Columbia), Research Associate, Rehabilitation, Human Resources and Communication Disorders
- Babcock, Robert E.**, Ph.D. (University of Oklahoma), Professor, Chemical Engineering
- Bachmann, Rachel E.**, Ph.D. (Indiana University), Visiting Assistant Professor, World Languages, Literature and Cultures
- Bacon, Craig D.**, Ph.D. (University of Tennessee), Adjunct Professor, Poultry Science
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- Bailey, Carlton**, J.D. (University of Chicago), Professor, Law
- Bailey, Kathryn**, D.P.T. (University of Central Arkansas), Visiting Assistant Professor, Health, Human Performance and Recreation
- Bailey, William C.**, Ph.D. (Texas Tech University), Associate Professor, Human Environmental Sciences

- Baird, Douglas H.**, D.V.M. (Louisiana State University), Adjunct Assistant Professor, Animal Science
- Bajwa, Sreekala G.**, Ph.D. (University of Illinois), Adjunct Associate Professor, Biological and Agricultural Engineering
- Baker, Kimberly**, Ph.D. (University of South Carolina), Assistant Professor, Rehabilitation, Human Resources and Communication Disorders
- Balazova, Eva**, Ph.D. (Slovak Agricultural University), Adjunct Professor, Agricultural Economics and Agribusiness
- Balda, Juan C.**, Ph.D. (University of Natal), University Professor, Electrical Engineering
- Baldwin, Vernice G. Cannon**, M.S. (University of Arkansas), Instructor, Human Environmental Sciences
- Ballard, Karen K.**, Ed.D. (University of Arkansas), Adjunct Professor, Agricultural and Extension Education
- Bandlerova, Anna**, Ph.D. (Slovak University of Agriculture in Nitra), Adjunct Assistant Professor, Agricultural Economics and Agribusiness
- Banerjee, Nilanjan**, Ph.D. (University of Massachusetts), Assistant Professor, Computer Science and Computer Engineering
- Barabote, Ravi D.**, Ph.D. (Texas Tech University), Assistant Professor, Biological Sciences
- Barber, Lon T.**, Ph.D. (Mississippi State University), Associate Professor, Crop, Soil and Environmental Sciences
- Barker, Kash A.**, Ph.D. (University of Virginia), Adjunct Assistant Professor, Industrial Engineering
- Barnes, Jeffery K.**, Ph.D. (Cornell University), Curator, Entomology
- Barraza-Lopez, Salvador**, Ph.D. (University of Illinois), Assistant Professor, Physics
- Barta, Kathleen M.**, Ed.D. (University of Arkansas), Associate Professor, Nursing
- Batzer, Stephen A.**, Ph.D. (Michigan Technological University), Adjunct Assistant Professor, Mechanical Engineering
- Baum, Jamie Ilene**, Ph.D. (University of Illinois), Assistant Professor, Food Science
- Bean, Jeff M.**, M.B.A. (University of Arkansas), Visiting Assistant Professor, Operations Management
- Beam, Edward A. III**, Ph.D. (Carnegie-Mellon University), Adjunct Assistant Professor, Microelectronics-Photonics
- Beard, Lonnie R.**, LL.M. (New York University), Professor, Law
- Beasley, Jennifer G.**, Ed.D. (University of Virginia), Assistant Professor, Curriculum and Instruction
- Beaupre, Steven J.**, Ph.D. (University of Pennsylvania), Professor, Biological Sciences
- Beavers, M. Gordon**, Ph.D. (Indiana University), Associate Professor, Computer Science and Computer Engineering
- Beck, Dennis E.**, Ph.D. (University of Florida), Clinical Assistant Professor, Curriculum and Instruction
- Beck, Jules K.**, Ph.D. (University of Minnesota), Clinical Assistant Professor, Rehabilitation, Human Resources and Communication Disorders
- Beck, Paul A.**, Ph.D. (University of Arkansas), Associate Professor, Animal Science
- Behrend, Douglas A.**, Ph.D. (University of Minnesota), Professor, Psychological Science
- Beike, Denise R.**, Ph.D. (Indiana University), Professor, Psychological Science
- Beitle, Robert R.**, Ph.D. (University of Pittsburgh), Professor, Chemical Engineering
- Belcher, Gregory G.**, Ph.D. (Ohio State University), Adjunct Assistant Professor, Rehabilitation, Human Resources and Communication Disorders
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- Bercher, Daniel**, Ph.D. (University of Arkansas), Adjunct Assistant Professor, Public Policy
- Berrier, Heather D.**, Ph.D. (University of California, Irvine), Visiting Professor, Physics
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- Bluhm, Burton H.**, Ph.D. (Purdue University), Assistant Professor, Plant Pathology
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- Brubaker, Robert P.**, Ph.D. (University of Michigan), Visiting Assistant Professor, History
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- Burch, Matthew I.**, Ph.D. (Rice University), Lecturer, Philosophy
- Burcham, R. Scott**, M.S.S.W. (University of Tennessee), Clinical Assistant Professor, Social Work
- Burgin, James W.**, M.B.A. (Golden Gate University), Instructor, Operations Management
- Burgos, Nilda R.**, Ph.D. (University of Arkansas), Professor, Crop, Soil, and Environmental Sciences
- Burke, Joan M.**, Ph.D. (Oregon State University), Adjunct Assistant Professor, Animal Science
- Burris, Sidney J.**, Ph.D. (University of Virginia), Professor, English
- Burson, Claudia S.**, Lecturer, Music
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- Smith, Kimberly G.**, Ph.D. (Utah State University), University Professor, Biological Sciences
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- Spiegel, Frederick W.**, Ph.D. (University of North Carolina), Professor, Biological Sciences
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- Stamenov, Ventsislav M.**, M.B.A. (University of Arkansas), Research Associate, Finance
- Stapp, Robert**, Ph.D. (Oklahoma State University), Clinical Associate Professor, Economics

- Starks, Tricia A.**, Ph.D. (Ohio State University), Associate Professor, History
- Starling Ledbetter, Robyn M.**, M.A. (University of Arkansas), Instructor, Journalism
- Stassen, Robert E.**, Ph.D. (University of Nebraska), Associate Professor, Marketing
- Stauss, Kimberly A.**, Ph.D. (University of Utah), Associate Professor, Social Work
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- Stewart, Patrick A.**, Ph.D. (Northern Illinois University), Assistant Professor, Political Science
- Stewart-Abernathy, Leslie C. III**, Ph.D. (Brown University), Research Professor, Anthropology
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- Sutherland, Daniel E.**, Ph.D. (Wayne State University), Distinguished Professor, History
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- Swedenburg, Ted R.**, Ph.D. (University of Texas at Austin), Professor, Anthropology
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- Taaffe, Kevin M.**, Ph.D. (University of Florida), Adjunct Assistant Professor, Industrial Engineering
- Tarvin, Timothy R.**, J.D. (University of Arkansas), Clinical Associate Professor, Law
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- Teague, Tina G.**, Ph.D. (Texas A&M University), Adjunct Professor, Entomology
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- Teng, Fangzhen**, Ph.D. (University of Maryland), Associate Professor, Geosciences
- Thallapuram, Suresh-Kumar**, Ph.D. (Osmania University), Associate Professor, Chemistry and Biochemistry
- Thaxton, Yvonne Vizzier**, Ph.D. (Auburn University), Professor, Poultry Science
- Thibado, Paul M.**, Ph.D. (University of Pennsylvania), Professor, Physics
- Thoma, Gregory J.**, Ph.D. (Louisiana State University), Professor, Chemical Engineering
- Thomas, Kabin A.**, M.M. (University of Wisconsin-Madison), Assistant Professor, Music
- Thomas, Patricia A.**, M.Ed. (University of Arkansas), Instructor, Curriculum and Instruction
- Thompson, Cecelia K.**, Ph.D. (Pennsylvania State University), Associate Professor, Curriculum and Instruction
- Thompson, Craig W.**, Ph.D. (University of Texas at Austin), Professor, Computer Science and Computer Engineering
- Thompson, Cynthia**, MFA (Rutgers, State University of New Jersey), Clinical Assistant Professor, Art
- Thompson, Dale E.**, Ph.D. (Pennsylvania State University), Associate Professor, Rehabilitation, Human Resources and Communication Disorders
- Thompson, Dale R.**, Ph.D. (North Carolina State University), Associate Professor, Computer Science and Computer Engineering
- Thompson, John Herd**, Ph.D. (Queen's University), Adjunct Professor, History
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- Thompson, Timothy F.**, M.M. (University of Wisconsin, Madison), Professor, Music
- Thomsen, Michael R.**, Ph.D. (University of Minnesota), Associate Professor, Agricultural Economics and Agribusiness
- Thorbole, Chandrashekhar K.**, Ph.D. (Wichita State University), Adjunct Associate Professor, Biological and Agricultural Engineering
- Thorn, Colin E.**, Ph.D. (University of Colorado), Adjunct Professor, Geosciences
- Tian, Zhengrong R.**, Ph.D. (University of Connecticut), Associate Professor, Chemistry and Biochemistry
- Tipsmark, Christian K.**, Ph.D. (University of Southern Denmark), Assistant Professor, Biological Sciences
- Tjani, Maria**, Ph.D. (Michigan State University), Assistant Professor, Mathematical Sciences
- Toner, Mary A.**, Ph.D. (University of Oklahoma), Associate Professor, Rehabilitation, Human Resources, and Communication Disorders
- Tran, Nam H.**, Ph.D. (University of Arkansas), Research Assistant Professor, Civil Engineering

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- Troxel, Tom R.**, Ph.D. (University of Illinois), Professor, Animal Science
- Trubitt, Mary Beth D.**, Ph.D. (Northwestern University), Research Associate Professor, Anthropology
- Tullis, Jason A.**, Ph.D. (University of South Carolina), Associate Professor, Geosciences
- Tung, Chao-Hung S.**, Ph.D. (University of Houston), Associate Professor, Mechanical Engineering
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- Ulrich, Richard K.**, Ph.D. (University of Texas), Professor, Chemical Engineering
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- Van Horn-Morris, Jeremy**, Ph.D. (University of Texas), Assistant Professor, Mathematical Sciences
- Vann, Stephen R.**, Ph.D. (Texas A&M University), Assistant Professor and Extension Pathologist, Plant Pathology
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- Varadan, Vijay K.**, Ph.D. (Northwestern University), Distinguished Professor, Electrical Engineering
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- Veden, Mary L.**, Ph.D. (University of Washington), Assistant Professor, Communication
- Veilleux, Jennifer**, Ph.D. (University of Illinois at Chicago), Assistant Professor, Psychological Science
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- Vyas, Reeta**, Ph.D. (State University of New York at Buffalo), Professor, Physics
- Wade, Leslie A.**, Ph.D. (University of California, Santa Barbara), Professor, Drama
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- Waldroup, P. W.**, Ph.D. (University of Florida), University Professor, Poultry Science
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- Wamische, Yeshe**, Ph.D. (University of Arkansas), Assistant Professor, Plant Pathology
- Wang, Junbo**, Ph.D. (Syracuse University), Assistant Professor, Finance
- Wang, Kelvin C.P.**, Ph.D. (Arizona State University), Professor, Civil Engineering
- Wang, Neil**, Ph.D. (Syracuse University), Assistant Professor, Finance
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- White, Calvin Jr.**, Ph.D. (University of Mississippi), Assistant Professor, History
- White, Don Jr.**, Ph.D. (Montana State University), Adjunct Professor, Biological Sciences
- White, John A.**, Ph.D. (Ohio State University), Distinguished Professor, Industrial Engineering
- Wibben, George**, M.B.A. (Central State University), Instructor, Management
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- Wicks, Jan L.**, Ph.D. (Michigan State University), Professor, Journalism
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- Wideman, Robert F.**, Ph.D. (University of Connecticut), Professor, Poultry Science
- Wiedenmann, Robert N.**, Ph.D. (Purdue University), Professor, Entomology
- Wiersma, Jacquelyn D.**, Ph.D. (Texas Tech University), Assistant Professor, Human Environmental Sciences, Public Policy
- Wilke, Stephen B.**, M.P.A. (University of Memphis), Visiting Assistant Professor, Operations Management
- Wilkins, Charles L.**, Ph.D. (University of Oregon), Distinguished Professor, Chemistry and Biochemistry
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- Williams, Nathan L.**, Ph.D. (George Mason University), Associate Professor, Psychological Science
- Williams, Patrick G.**, Ph.D. (Columbia University), Associate Professor, History
- Williams, Rodney D.**, Ph.D. (University of Arkansas), Visiting Assistant Professor, Civil Engineering
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- Wolpert, Rembrandt F.**, Ph.D. (University of Cambridge), Professor, History
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- Woods, Randall B.**, Ph.D. (University of Texas), Distinguished Professor of History and holder of the John A. Cooper, Sr., Distinguished Professor of Diplomacy
- Worden, Steven K.**, Ph.D. (University of Texas), Associate Professor, Sociology and Criminal Justice
- Worrell, Dan L.**, Ph.D. (Louisiana State University), Professor and Sam M. Walton Leadership Chair, Management
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- Wu, Jingxian**, Ph.D. (University of Missouri), Assistant Professor, Electrical Engineering
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- Xie, Kangzhen**, Ph.D. (Washington University), Assistant Professor, Finance
- Xie, Xiangyang**, Ph.D. (University of Wyoming), Assistant Professor, Geosciences
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- Yang, Song**, Ph.D. (University of Minnesota), Associate Professor, Sociology and Criminal Justice
- Yanoviak, Stephen P.**, Ph.D. (University of Oklahoma), Adjunct Professor, Entomology
- Yazwinski, Thomas A.**, Ph.D. (North Carolina State University), University Professor, Animal Science
- Ye, Kaming**, Ph.D. (East China University of Science and Technology), Associate Professor, Biological and Agricultural Engineering
- Yeager, Milton P. Jr.**, M.S. (University of Arkansas), Visiting Assistant Professor, Operations Management
- Yeager, Timothy J.**, Ph.D. (Washington University), Associate Professor and Arkansas Bankers Association Chair in Banking, Finance

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Young, James C., Ph.D. (Stanford University), Professor, Civil
Engineering

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Zeng, Ka, Ph.D. (University of Virginia), Professor, Political
Science

Zhang, Shengfan, Ph.D. (North Carolina State University), As-
sistant Professor, Industrial Engineering

Zhang, Wen, Ph.D. (Purdue University), Assistant Professor,
Civil Engineering

Zheng, Nan, Ph.D. (University of Michigan), Assistant Profes-
sor, Chemistry and Biochemistry

Ziegler, Joseph A., Ph.D. (University of Notre Dame), Profes-
sor, Economics

Zilinsky, Anthony J., M.B.A. (University of Hartford), Visiting
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Zou, Min, Ph.D. (Georgia Institute of Technology), Associate
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Appendix A

THE ACADEMIC COMMON MARKET

The Academic Common Market is an interstate agreement among Southern states for sharing uncommon academic programs. Participating states are able to make arrangements for their residents who qualify for admission to enroll as in-state students for fee purposes.

The Common Market concept recognizes that it is impractical for every state to attempt development of programs in every field of knowledge. Each Southern state has programs which are not offered in some of the other states and which can accommodate additional students. Through the sharing of such programs, the market assists in eliminating unnecessary duplication and in increasing access to programs which meet the educational needs of the citizens of the South.

To enroll as an Academic Common Market student, you must:

1. Be accepted for admission into a program to which your state has obtained access for its residents through the Academic Common Market. Applications for admission should be made directly to the institution offering the program.
2. Obtain certification of residency from the Common Market coordinator for certification information.

The opportunities presently available at the University of Arkansas, Fayetteville, at in-state rates to residents of Southern states through the Academic Common Market are listed in the column to the right.

STUDENT RESIDENCE STATUS FOR TUITION AND FEE PURPOSES

Board Policy 520.8 (Revised January 18, 1985)

The full text of the University of Arkansas Board of Trustees policy statement 520.8, Student Resident Status for Tuition and Fee Purposes, is provided below followed by a statement on implementing the policy at the University of Arkansas, Fayetteville.

Determination of Residence Status

I. Purpose

The purpose of these regulations is to enable the administrative officers of the University of Arkansas to classify students for the purpose of paying student fees, as either "in-state" or "out-of-state," so as to accord fairness and equity to the students of the University and to the public, which provides support for the educational services provided by the University.

ACADEMIC COMMON MARKET PROGRAMS AT THE UNIVERSITY OF ARKANSAS

Available at In-State Student Rates for Residents of States Indicated

Program	Bachelor's	Master's	Ph.D.	Ed.D.
Anthropology		WV		
Architecture	KY			
Kinesiology		LA GA OK	OK	
Landscape Architecture	DE			
Philosophy			AL MS	
Public Policy			OK	
Rehabilitation		LA MS		
Transportation & Logistics Mgmt.	KY	TX		

II. Initial Classifications

A. A student shall be admitted to the University in an "in-state" or "out-of-state" status for university fee purposes, as established under these regulations.

Except as otherwise provided under these regulations, a student classified as "in-state" for university fee purposes at the time of admission must have established a bona fide domicile in Arkansas and must have resided continuously in this state in that bona fide domiciliary status for at least six consecutive months prior to the beginning of the term or semester for which fees are paid.

B. A bona fide domicile is a home of apparent true, fixed, and permanent nature, a place of actual residing for all purposes of living that may be distinguished from a temporary sojourn in this state as a student. The person claiming domicile in Arkansas must

provide evidence of permanent connection with the State of Arkansas and demonstrate the expectation of remaining in this state beyond graduation. For purposes of implementing these policies, the administration is directed to articulate standards which will be applied in making the determination of residence.

- C. Except as otherwise provided under these regulations, the domicile of an adult (18 years of age or older) or emancipated minor student shall be determined on the basis of his or her own domicile.
- D. Except as otherwise provided under these regulations, the domicile and residence of an unemancipated minor student (less than 18 years of age) or an unmarried dependent who has not attained the age of 23 is legally that of the parents or surviving parent; or such other person legally standing in the place of a parent to the student and with whom the student in fact makes his or her home and who has been making substantial contributions to the support of the student for at least six consecutive months prior to the term or semester for which the fees are paid.
- E. A student who cannot satisfy the criteria for Arkansas domicile and residence will be classified as an “out-of-state” student and will pay fees and tuition accordingly. The student on a temporary visa will be classified as a foreign student and will pay non-resident tuition and fees. A student who has been granted a permanent visa and has been domiciled in Arkansas for six consecutive months following receipt of the permanent visa shall be classified as an Arkansas resident for fee purposes.
- F. The responsibility for registering under a proper classification for student fee purposes is placed upon the student. It is the duty of each student at each time of registration to call any question about residency classification status to the attention of the campus classification review officer in a timely fashion in order that the question may be settled (see IV Procedures).
- G. The six-month period required in paragraph A of these regulations may be waived for persons, their spouses, and their unmarried children (who have not yet attained the age of 23) who move to Arkansas with attendance at the University only a by-product of the primary purpose of establishing domicile in this state.
- H. An unmarried student who has not reached the age of 23 years having one parent residing in Arkansas (for at least six consecutive months immediately prior to the beginning of the term or semester in which the fees are to be paid) may be considered an “in-state” student for fee purposes, even if that student resided outside the state with the other parent before coming to Arkansas to attend the University.
- I. Marriage is recognized as emancipation for both females and males.
- J. The spouse of a person continuously domiciled in Arkansas (for at least six consecutive months immediately prior to the beginning of the term or semester in which the fees are to be paid) upon request shall be classified as “in-state” for fee purposes.

III. Reclassifications

- A. The initial classification of a student will not prejudice a different classification for following terms or semesters. However, a student’s prior domicile is assumed to continue until he or she clearly establishes a new domicile in Arkansas (see IV Procedures).
- B. A student previously classified as “out-of-state” may be reclassified as “in-state” for fee purposes if he or she has established a bona fide domicile in Arkansas and has resided continuously in this state in that bona fide domiciliary status for at least six consecutive months prior to his or her reclassification by the University. In order for an

adult or an emancipated minor to establish a bona fide domicile in Arkansas for fee purposes, he or she must have left the parental home, must have established in this state a home of a permanent character as manifested objectively by good faith acts, and must have the expectation of remaining in this state beyond graduation. The single fact of presence in Arkansas for at least six months of attendance as a student enrolled in the University of Arkansas, or any other educational institution, neither constitutes nor necessarily precludes reclassification as one domiciled in Arkansas, but will be a factor to be considered.

IV. Procedures

- A. A student shall have the burden of establishing any claim that he or she is entitled to be treated as “in-state” for fee purposes. Persuasive evidence to that effect must be presented in writing and verified under oath by the student. Mere claims of local domicile and duration of stay are of little weight. A student who knowingly gives erroneous information in an attempt to evade the payment of “out-of-state” fees may be subject to dismissal from the University.
 - B. All disputed classifications for student fee purposes, whether at initial enrollment or subsequent enrollments, and all disputed reclassifications will be decided initially on each campus by a classification review officer designated by each Chancellor.
 - C. The Chancellor of each campus will designate a campus classification appeal officer to receive petitions from decisions made by the campus classification review officer. Each campus classification appeal officer may, in his or her discretion, make investigations, receive evidence, and conduct informal hearings. After considering the case, the campus classification appeal officer will render a decision and notify the affected student of the decision in writing. Any decision of the campus classification appeal officer may be appealed to the Vice President for Academic Affairs of the University of Arkansas System, who shall recommend final disposition to the President of the University.
 - D. Written notice of the appeals procedure will be provided to each student raising a question about his or her status with the campus residency classification review officer.
 - E. Determination of domicile will be based on a review of all pertinent facts, evidence, and circumstances which collectively show, in an objective and clear manner, the actual domicile of the student.
- Note: In implementing these policies, it is presumed that dependent students who are classified as non-residents based upon parental/guardian domicile outside of Arkansas do not acquire Arkansas residency under Board of Trustees Policy 520.8 unless and until their parent(s)/guardian(s) have established a domicile in Arkansas, or the student has left the parental home and established a domicile in Arkansas evidenced by proof that he or she has established a home of a permanent character as manifested objectively by good faith acts, resided in Arkansas in bona fide domiciliary status for at least six consecutive months prior to his or her reclassification as an Arkansas resident, and demonstrates the expectation of remaining in this state beyond graduation.

RECLASSIFICATION DEADLINES

Students who have established a bona fide domicile in Arkansas following initial classification as a non-resident must request reclassification if they want their status recognized for fee purposes. Applications and appropriate

documentation must be received by the Office of the Registrar no later than the fifth class day (second class day of a summer session) of the term for which in-state fee assessment is requested. Applications received after the deadline will be considered for the next term. All fees are to be paid by published due dates. Students who receive a favorable decision after payment will be provided a refund of out-of-state fees paid. Please direct questions about residence classification review procedures to the Registrar, 146 Silas H. Hunt Hall.

RESIDENCE STATUS OF NATIVE AMERICANS

Board Policy 520.1 (Revised January 29, 1989)

Native American people in other states belonging to tribes that formerly lived in Arkansas before relocation, and whose names are on the rolls in tribal headquarters, shall be classified as in-state students of Arkansas for tuition and fee purposes on all campuses of the University of Arkansas. Tribes so identified include the Caddo, Cherokee, Chickasaw, Choctaw, Creek, Delaware, Kickapoo, Osage, Peoria, Quapaw, Shawnee, and Tunica.

RESIDENCE STATUS OF MEMBERS OF THE ARMED FORCES AND THEIR DEPENDENTS

Board Policy 520.7 (Revised January 18, 1985)

Effective January 1, 1975, members of the Armed Forces who are stationed in the state of Arkansas pursuant to military orders, and their unemancipated dependents, shall be entitled to classification as in-state students for fee-paying purposes (per Arkansas Stat. Ann. 80-3366).

Persons continuously domiciled in Arkansas for at least twelve consecutive months, who enter active military service from this state and who maintain Arkansas as the permanent home of record while on active military duty, and their dependents, shall be entitled to classification as in-state students for fee-paying purposes. This provision is forfeited if the military person does not return to Arkansas within twelve months after separation, discharge, or retirement from active duty.

Persons serving in active military service who demonstrate a change of bona fide domicile from another state to Arkansas at least twelve consecutive months prior to separation, discharge, or retirement from active military duty, and their dependents, shall be entitled to classification as in-state students for fee-paying purposes. This provision is forfeited if the military person does not return to Arkansas within twelve months after separation, discharge, or retirement from active duty.

RESIDENCE STATUS OF STUDENTS FROM TEXARKANA, TEXAS, AND BOWIE COUNTY, TEXAS

Board Policy 520.10 (Adopted November 16, 1984)

In accordance with the reciprocity agreement described in H.C.R. 32, signed by the Governor of Arkansas on February 12, 1965, residents of Texarkana, Texas, and Bowie County, Texas, will be classified as in-state students for university fee purposes at the University of Arkansas.

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